

**MECHANISMS AND DECISION MAKING ABOUT PAP TEST USE AMONG  
KOREAN AMERICAN WOMEN**

by

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## ABSTRACT

**Background:** Cervical cancer is the fourth common cancer in women worldwide. Health literacy has emerged as a critical factor in enabling individuals to endorse desirable health behaviors, including cervical cancer screening. Despite a growing body of research on the association between health literacy and cervical cancer screening, no known study has comprehensively examined links between health literacy and Pap test use among women of diverse racial/ethnic groups, such as Korean Americans (KA).

**Objectives:** The objectives of this study were two-fold: 1) to examine the association between health literacy, theoretically selected psychosocial determinants (cervical cancer knowledge, decisional balance for a Pap test, worry related to cervical cancer examination, cervical cancer self-efficacy and perceived social support), and Pap test use within the preceding three years; and 2) to explore decision making regarding Pap test use among KA women.

**Design and Methods:** This study utilized a cross-sectional correlational design and consists of a secondary analysis of data collected from a community-based controlled trial (hereafter “parent study”) to promote mammogram and Pap test use among KA women, along with semi-structured individual interviews. Descriptive statistics and structural equation modeling were used for analysis of quantitative aim. Qualitative data were analyzed using open, inductive coding.

**Sample:** A total of 560 of KA women aged 21-65 years residing in the Baltimore-Washington metropolitan area participated in the parent study at baseline. Thirty women participated in a qualitative interview designed to elucidate further information about their decision-making process concerning Pap tests.

**Findings:** The results from structural equation modeling showed that the association between health literacy and KA women's Pap test use was mediated by cervical cancer knowledge, decisional balance for a Pap test, and cervical cancer self-efficacy. Cervical cancer worry and perceived social support were not mediators between the associations. Three main categories associated with decision making about a Pap test emerged from the qualitative interviews: decision types, barriers and facilitators in regard to a decision about a Pap test, and decision reflection. While types of decision making about a Pap test varied, most women claimed they made the decision autonomously. When women reflected on their decision, most felt glad that they got a Pap test and would make the same decision again, whereas some women with negative results felt ambivalent about their decision. Some women chose to live with their decision not to receive a Pap test. A number of participants noted that fear of cervical cancer could both promote and hinder Pap test use.

**Conclusions:** Findings from this study indicate that health literacy is positioned to reduce disparities in cervical cancer screening by influencing theoretically driven psychosocial determinants. Understanding the decision-making process about Pap test use is the first step toward developing a patient-centered approach to improve compliance with cervical cancer screening guidelines. Research examining the influence of health literacy on Pap test use at the individual, community, and system levels is warranted to increase the rates of Pap test use among women from racial/ethnic minorities such as KA women.

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## **DEDICATION**

My dissertation is dedicated to my parents and my in-laws who inspire me to see things differently.

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## **CHAPTER ONE: INTRODUCTION**

### **Background**

The United States (U.S.) is one of the most racially/ethnically divergent nations in the world due in part to the ongoing inflow of immigrants, particularly Asians and Hispanics (Humes, Jones, & Ramirez, 2011). The 2010 census reported that the Asian and Hispanic individuals—the most rapidly growing racial/ethnic groups in the U.S.—had grown by more than 40% over the last decade (Humes et al., 2011). Given the rapid growth of immigrant populations, the number of individuals whose first language is not English is becoming larger. For example, while the U.S. population grew 38% over the last three decades, the limited English proficient individuals grew by 158% during this time period (Ryan, 2011). The demographic trend in the U.S. warrants attention to health problems of the increasing immigrants.

Worldwide, cervical cancer is one of the most common cancers in women (Ferlay et al., 2015). Over the past few decades, great progress has been achieved in cervical cancer control in developed countries due in part to earlier diagnosis through adequate screening (Arbyn, Raifu, Weiderpass, Bray, & Anttila, 2009; Vesco et al., 2011). Yet, even within developed countries such as the U.S., particular racial/ethnic groups such as Asian immigrants face a higher burden of cervical cancer due to delayed diagnosis, which usually relates to low rates of receiving a Pap test (American Cancer Society, 2012; McCracken et al., 2007; Miller, Chu, Hankey, & Ries, 2008; Wang, Carreon, Gomez, & Devesa, 2010). For example, the risk of developing cervical cancer and eventually dying from it among Korean American (KA) women is almost twice and 1.5 times, respectively compared to their non-Hispanic white counterparts (Miller et al., 2008; Wang et al., 2010). Surprisingly, they are least compliant with national cervical cancer screening guidelines among diverse ethnic groups in the U.S. (up to 68% vs. about 89% in white women

and nearly 92% in black women) (Centers for Disease Control and Prevention, 2004; McCracken et al., 2007; Nasser, Cress, & Leiserowitz, 2006).

Health literacy—“the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions” (Ratzan & Parker, 2000)—is a cognitive skill set for women to adequately navigate the U.S. healthcare system and make informed decisions in order to function as a healthcare consumer (Nutbeam, 2000; Speros, 2005). While more than 75 million American adults suffer from limited health literacy, limited health literacy particularly affects limited English proficient Asian immigrants (36% to 75% of Korean immigrants) (Han, Kim, Kim, & Kim, 2011; Sentell & Braun, 2012). In a recent literature review on health literacy and health outcomes, health literacy was highlighted as a potential means of eliminating disparities in health outcomes (Berkman, Sheridan, Donahue, Halpern, & Crotty, 2011). This draws attention to the potential role of health literacy to negotiate and adequately navigate the U.S. healthcare system for obtaining cervical cancer screening among limited English proficient immigrants such as KA women.

### **Significance of the Study**

Despite the potential role in overcoming health disparities among limited English proficient immigrants, the role of health literacy has not been investigated in the context of cervical cancer control among KA women, one of the understudied subgroups of Asian immigrants with high cervical cancer incidence and mortality. This study seeks to expand current knowledge of the impact of health literacy as a critical tool for changing preventive practices such as cervical cancer screening in a high-risk group of women by examining the mechanisms in which KA women’s health literacy is associated with their decision to receive a Pap test. A comprehensive health literacy-focused framework derived from social and cognitive models of

health behavior guides this study. The logical deduction of the health literacy-focused theoretical framework sheds light on the potential links between health literacy and Pap test use through theoretically driven psychosocial mediators (von Wagner, Steptoe, Wolf, & Wardle, 2009); however, no known study has tested how psychosocial determinants mediate the relationship between health literacy and KA women's receipt of Pap tests using a health literacy-specific conceptual framework. This study adds empirical support for a health literacy-specific framework while suggesting modifications to the framework that make it applicable to recent immigrant women. The cultural influence on cervical cancer screening has been promoted in studies of limited English proficient immigrants, yet only a few available studies have investigated recent immigrant women's decisions about a Pap test within the context of their culture. This study builds on knowledge in the context of cervical cancer control by providing potentially important yet hitherto unknown cultural factors to assist KA women in navigating the U.S. healthcare system to learn about and engage in preventive healthcare practices. The findings may therefore play a foundational role in helping the women manage their health.

To this end, the purposes of this study were two-fold: (1) to understand the relationships between health literacy, theoretically selected psychosocial variables, and receipt of a Pap test in the preceding three years in one of the most rapidly growing limited English proficient ethnic groups of women with heightened cervical cancer burden—namely KAs; and (2) to explore the KA women's perceptions and decision making about a Pap test.

### **Specific Aims and Hypotheses**

The specific aims of this proposed study were as follows:

**Aim 1:** To examine the relationships between health literacy, psychosocial determinants, and Pap test use within the preceding three years, even after controlling for sociodemographic and system factors.

**Hypothesis 1a:** Higher health literacy would be associated with the following psychosocial determinants: (1) more cervical cancer knowledge, (2) positive decisional balance, (3) less worry about cervical cancer examination, (4) higher cervical cancer self-efficacy, or (5) higher perceived social support.

**Hypothesis 1b:** Higher health literacy would be associated with Pap test use in the preceding three years than lower health literacy.

**Hypothesis 1c:** The association between health literacy and Pap test use in the preceding three years is attenuated if psychosocial determinants are added to the model: (1) cervical cancer knowledge, (2) decisional balance for a Pap test, (3) worry related to cervical cancer examination, (4) cervical cancer self-efficacy, or (5) perceived social support.

**Aim 2:** To explore KA women's decision making about a Pap test.

**Research Question 2a:** How did KA women make a decision about their Pap test use?

**Research Question 2b:** What prohibited or facilitated KA women's decision to undergo a Pap test?

**Research Question 2c:** How did KA women reflect on their decision to receive or not to receive a Pap test?

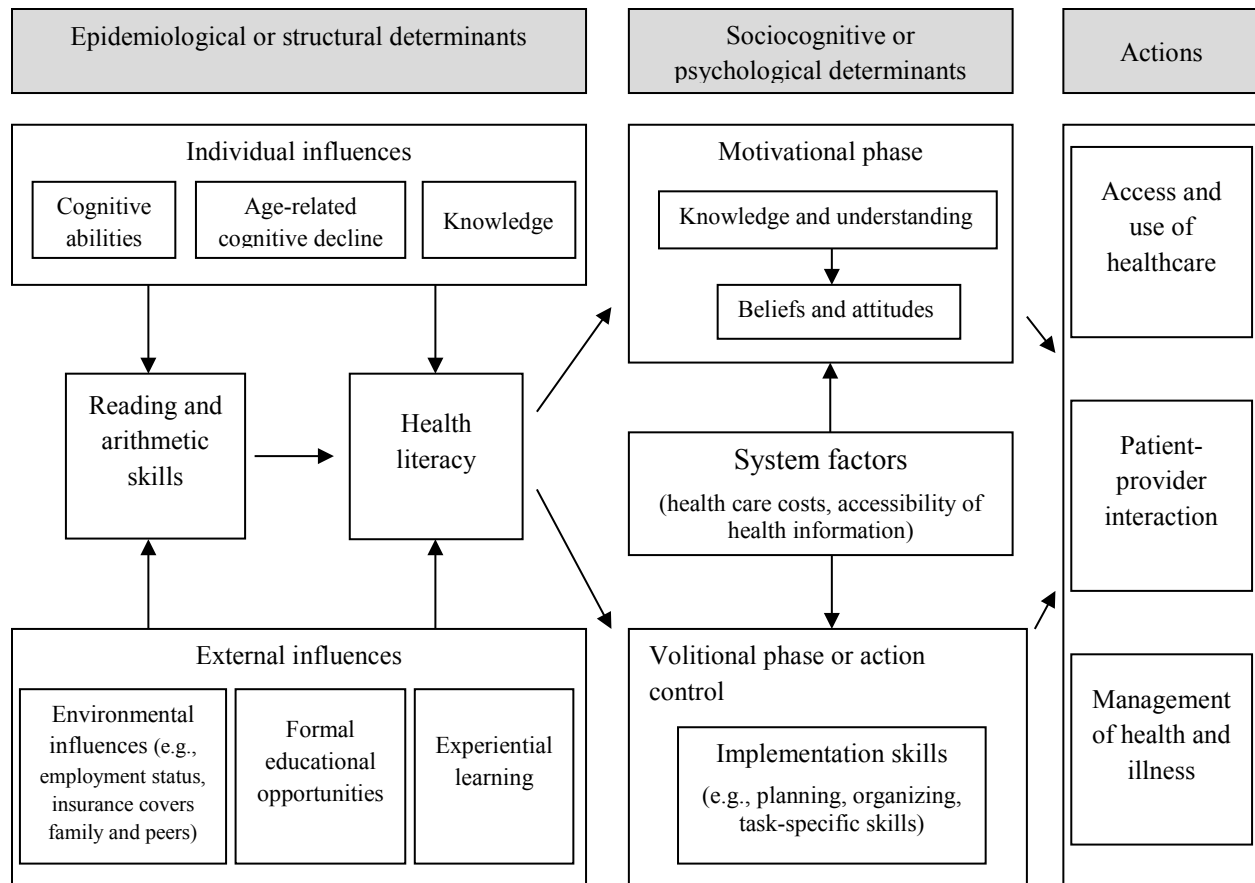
## **Theoretical Framework**

The theoretical framework that guided this study is von Wagner's framework of health literacy and health action, which offers a comprehensive pathway to the ways in which health literacy influences health actions and health outcomes (von Wagner et al., 2009). The framework of health literacy and health action was deduced from social cognitive models of health action, including the Health Belief Model (Janz & Becker, 1984), the Theory of Planned Behavior (Ajzen, 1991), and previous plausible causal pathways between health literacy and health suggested by Paasche-Orlow and Wolf (2007).

Health literacy is defined as a requisite skill set needed for health-related decision making in the context of a specific task; thus, not only an individual's ability but also the demand of the specific tasks constitute whether one is health literate or not (Paasche-Orlow & Wolf, 2007; Ratzan & Parker, 2000). As shown in Figure 1.1, health literacy is influenced by both individual (i.e., cognitive abilities, age-related cognitive decline, and prior knowledge), and external factors (i.e., health insurance and employment status, formal educational opportunities, and experiential learning) in addition to reading and arithmetic skills (von Wagner et al., 2009).



Figure 1.1 von Wagner's (2009) Health Literacy and Health Action Framework



As an application of the Health Belief Model (Janz & Becker, 1984) and Theory of Planned Behavior (Ajzen, 1991), the model proposes motivational and volitional phases as potential pathways between health literacy and health action. In the motivational phase, psychosocial determinants, such as knowledge, beliefs, and attitudes, and in the volitional phase or action control, variables, such as self-efficacy and implementation skills, are hypothesized as mediating factors between health literacy and health action (von Wagner et al., 2009). The motivational and volitional variables may also be influenced by systemic factors, such as out-of-pocket healthcare costs and accessibility of health information (von Wagner et al., 2009). The health action includes access and use of healthcare, patient-provider interaction, and

management of health and illness; each health action may occur either dependently or independently regardless of other types of health action (Paasche-Orlow & Wolf, 2007).

Although von Wagner's health literacy and health action framework sheds some light on the link between health literacy and health actions and outcomes (von Wagner et al., 2009), modification is necessary to apply the framework to immigrant women with limited English proficiency. This is particularly related to the gap between the logical deduction of von Wagner's framework and empirical evidence supporting the concepts included in the framework. Several individual and external factors (e.g., knowledge acquired from parent-infant interactions and experiential learning) in the framework are not fully operationally defined with valid measurement tools, nor does the framework include key factors pertinent to recent immigrants (e.g., limited language proficiency). Thus, the following modifications were made: (1) antecedents of health literacy to include correlates of Pap test use among limited English proficient immigrant women such as English proficiency (Soto Mas, Ji, Fuentes, & Tinajero, 2015; Todd & Hoffman-Goetz, 2011), (2) psychosocial variables to include correlates of Pap test use among KA women such as social support (Juon, Seung-Lee, & Klassen, 2003), and (3) adding system factors (e.g., accessibility of health information; Fox et al., 2009) as part of the sociocognitive factors influencing psychosocial determinants.

Figure 1.2 Hypothesized conceptual model

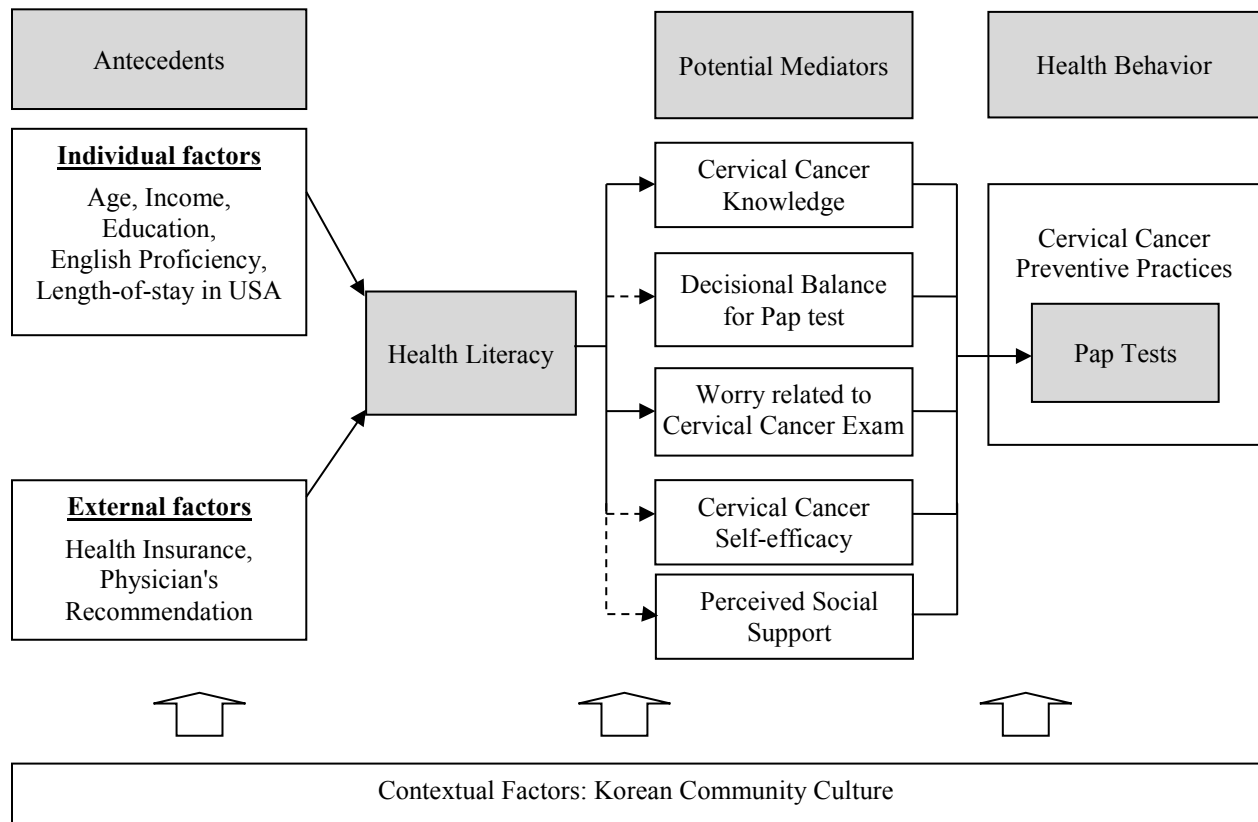


Figure 1.2 depicts the conceptual framework for the current study. Guided by the modified health literacy and health action framework, this study assessed whether and how KA women's health literacy influences their use of healthcare (receipt of a Pap test), exploring possible mediating effects of psychosocial determinants (cervical cancer knowledge, decisional balance for a Pap test, worry related to cervical cancer examination, cervical cancer self-efficacy, and perceived social support). This modified framework proposes the ways in which health literacy influences Pap test use by illuminating the role of health literacy on Pap test use among limited English proficient Korean American immigrants. The literature review that follows is structured based on the study framework.

### Antecedents of Health Literacy

The antecedents of health literacy of the proposed study include age, income, marital status, educational attainment, English proficiency, health insurance, length-of-stay (years) in the U.S., and a physician's recommendation. Sociodemographic determinants of health literacy—age, income, education, English proficiency, and health insurance—appear to overlap factors associated with receipt of a Pap test among KA women; therefore, factors particularly associated with Pap tests were added to the other sociodemographic factors related to health literacy.

Individual factors are age, income, education, length-of-stay in the U.S., and English proficiency. Studies reported that older age is negatively associated with higher health literacy (Baker, Gazmararian, Sudano, & Patterson, 2000; Baker et al., 2002; Federman, Sano, Wolf, Siu, & Halm, 2009). For example, in the 2003 National Assessment of Adult Literacy, adults aged 65 years and older had lower average health literacy than younger adults, whereas adults 25 to 39 years of age had higher average health literacy than other age groups (Kutner, Greenberg, Jin, & Paulsen, 2006). Income appears to be positively associated with higher health literacy (Kutner et al., 2006; Paasche-Orlow, Parker, Gazmararian, Nielsen-Bohlman, & Rudd, 2005). Kutner et al. (2006) found that adults who live below the poverty level had lower average health literacy than adults living at or above the poverty level. Higher education is also positively associated with higher health literacy (Kutner et al., 2006; Paasche-Orlow et al., 2005). A systematic review on the prevalence of limited health literacy reported that studies that have a higher proportion of high school graduates had a lower prevalence of limited health literacy than studies with a lower proportion of high school graduates (Paasche-Orlow et al., 2005).

As individual factors related to health literacy relevant to limited English proficient immigrant women, limited English proficiency appears to be associated with limited health literacy (Kutner et al., 2006; Sentell, & Braun, 2012). For example, in the 2003 National

Assessment of Adult Literacy, speaking English before starting formal education was positively associated with higher average health literacy compared to speaking English after starting formal education (Kutner et al., 2006). In addition, a longer stay in the U.S. appears to be associated with greater likelihood of having a Pap test (Juon, Choi, & Kim, 2000; Sohn & Harada, 2005). A study of 656 KA women residing in California found that those who had spent longer than 25% of their lives in the U.S. were more likely to have received a Pap test within two years (Sohn & Harada, 2005).

One external factor—receiving a physician's recommendation for a Pap test—is particularly associated with receipt of a Pap test. Receiving a physician's recommendation for a Pap test is positively associated with regular use (an annual Pap test as well as a Pap test within two years) of a Pap test among 459 KA women recruited from Korean churches and senior housing (Juon et al., 2003). This factor may also be considered as a form of accessibility of health information proposed in the original health literacy and health action framework (von Wagner et al., 2009). In addition, having private health insurance appears to be positively associated with higher health literacy (Kutner et al., 2006; Paasche-Orlow et al., 2005). In the 2003 National Assessment of Adult Literacy, adults who have no health insurance and adults who have Medicare and Medicaid tend to have lower average health literacy than adults who have insurance coverage through theirs or a family member's employer, through the military, or through private health insurance (Kutner et al., 2006).

### **Psychosocial Correlates of Pap Test Use as Mediators of Health Literacy**

Only one empirical study has tested the mediating effect of a psychosocial mediator (i.e., health knowledge) on receipt of a Pap test (S. Y. Lee, Tsai, Tsai, & Kuo, 2012). No study has examined the mediating effects of psychosocial variables on the relationship between health

literacy and a Pap test among limited English proficient Asian immigrants in the U.S. healthcare system. Accordingly, the following section suggests potential pathways linking health literacy and health actions and outcomes generally, not limited to cervical cancer screening behavior.

### **Cervical Cancer Knowledge**

Knowledge is one of the most frequently tested constructs in the context of cervical cancer control (Brewer & Fazekas, 2007; Johnson, Mues, Mayne, & Kiblawi, 2008). Although knowledge alone may not be sufficient to explain women's cervical cancer screening behavior, it is essential for immigrant women to obtain cervical cancer knowledge to take a Pap test. For example, qualitative studies examining perceptions regarding Pap tests among non-adherent KA women revealed that most of them either had limited knowledge of cervical cancer, or had misconceptions about cervical cancer, its risk factors and its treatments (K. Kim et al., 1999; E. E. Lee, Tripp-Reimer, Miller, Sadler, & Lee, 2007). In turn, studies found that receipt of Pap tests among KA women was associated with knowledge of cervical cancer screening guidelines (Juon et al., 2003) and cervical cancer knowledge (specific information was not given; Ma et al., 2009). Human papillomavirus (HPV) infection is a necessary cause of cervical cancer, accounting for more than 70% of cervical cancers (Walboomers et al., 1999). Thus, knowledge of HPV infection may influence women's receipt of Pap tests. In a study to examine factors related to uptake of a Pap test among Vietnamese women, those who knew that HPV causes cervical cancer were more likely to receive their lifetime Pap tests (Ma et al., 2012). No known study has included information about HPV in exploring the factors related to receipt of Pap tests among KA women.

Knowledge of cervical cancer was also significantly associated with health literacy (Garbers & Chiasson, 2004; Lindau et al., 2002). Conceptually, there was no difference between

the studies of the association between cervical cancer knowledge and receipt of a Pap test and the studies testing the association between health literacy and cervical cancer knowledge. For example, health literacy was an independent factor in knowing the purpose of a Pap test among an ethnically diverse sample of women (58% were African American) recruited from ambulatory women's clinics at an urban teaching hospital (Lindau et al., 2002). In this study, *cervical cancer knowledge as a potential mediator* is a term used to describe knowledge related to basic information on risk factors including knowledge of HPV, symptoms, and treatments of cervical cancer, including the purpose of a Pap test.

### **Decisional Balance for Pap Tests**

Decisional balance is derived from the theoretical model of decision making proposed by Janis and Mann (1977) that represents both the cognitive and motivational processes of human planning of a specific action (Janis & Mann, 1977). The main assumption of the decisional balance of incentives is that an individual makes a decision relative to a comparison of gains versus losses of a particular behavioral change (Janis & Mann, 1977). The decisional balance measure—the relative weight of perceived benefits (pros) against the perceived risks (cons) of behavioral change (Janis & Mann, 1977; Rakowski et al., 1992; Velicer, DiClemente, Prochaska, & Brandenburg, 1985)—has been applied to understand the adoption of health-related behaviors in integration with the Transtheoretical Model (Prochaska & DiClemente, 1983; Prochaska & Velicer, 1997). The use of the decisional balance construct, however, may not be limited to the Transtheoretical Model because the measure consists of perceived benefits and risks of particular health behaviors which are constructs proposed by the Health Belief Model (Janz & Becker, 1984).

In the context of cervical cancer control, Strong and Liang (2009) found that high decisional balance scores for a Pap test were positively associated with women's receipt of recent Pap tests. Of 507 Chinese women 50 years of age and older, who had regular screening (at least two consecutive Pap tests every two years) in the past four years had the highest decisional balance measures. This implied more positive attitudes toward Pap tests (Strong & Liang, 2009). These women had significantly higher scores than those in other groups. This study used the decisional balance scale developed for a Pap test by Rakowski et al. (1997) to measure perceived benefits and risks for a Pap test. No study has examined the association between health literacy and decisional balance for a Pap test and the role of decisional balance as a mediator. Thus, based on the previously found significant association with cervical cancer screening among limited English proficient Asian immigrants, in this study, *decisional balance for Pap test* is a term used to describe the average measures of the perceived benefits (e.g., “A Pap test finds cancer at a point when it is more likely to be cured.”) and the perceived risks (e.g., “I worry that if I have a Pap test, I will need an operation.”) for a Pap test among KA women (Rakowski et al., 1997).

### **Worry related to Cervical Cancer Examination**

It is common for physically ill individuals to experience fears associated with varying aspects of the disease itself. Illness-associated fears are referred to as fear of progression (FoP) (Herschbach & Dinkel, 2014). Though limited, the concept of FoP has been applied to understand health outcomes including quality of life among chronically ill patients such as cancer patients (Mehnert, Berg, Henrich, & Herschbach, 2009; S. Sarkar et al., 2015). Worry related to cervical cancer examinations is derived from a concept of FoP, which refers to an



individual's worry following abnormal Pap test results (a diagnosis of cervical cancer) in this study.

Although no study has operationalized the concept of cervical cancer worry through the worry related to cervical cancer examination scale in the context of cervical cancer control, two studies have reported a negative association between health literacy and worry associated with cervical cancer (Lindau et al., 2002; Schapira et al., 2011). For example, Lindau et al. (2002) found that the levels of health literacy affected how women would react in a situation where they received abnormal Pap test results. Women with low health literacy tended to panic or not have proper information regarding what to do and would not seek medical treatment, compared to their high health literacy counterparts (Lindau et al., 2002). Despite attention to the worry related to abnormal Pap test results, no study has examined the association between worry following abnormal Pap test results and the receipt of a Pap test and the role of cervical cancer-related worry as a potential mediator. In this study, *worry related to cervical cancer examination* is a term to describe a woman's worry if she were informed of being diagnosed with cervical cancer.

### **Cervical Cancer Self-efficacy**

Self-efficacy is an individual's ability to exercise control over his or her health habits; belief in one's self-efficacy plays a key role in changing behaviors (Bandura, 2004). The self-efficacy construct has been shown to be associated with self-care management in chronic diseases such as diabetes (Johnston-Brooks, Lewis, & Garg, 2002; U. Sarkar, Fisher, & Schillinger, 2006) and high blood pressure (J. E. Lee et al., 2010). In the context of cervical cancer control, a growing body of literature supports the notion that self-efficacy is associated with their receipt of a Pap test (e.g., Fang, Ma, Tan, & Chi, 2007; Ma et al., 2013). Fang et al. (2007) reported that KA women who strongly agree or agree that they are confident in their

ability to obtain a Pap test were more likely to receive their lifetime sequence of Pap tests. Although Fang et al. (2007) revealed that higher cervical cancer self-efficacy was associated with a woman's lifetime receipt of Pap tests, the study used only a single item (confidence in obtaining a Pap test) to capture the cervical cancer self-efficacy construct. It is possible, however, that a single item focusing on Pap test procedure may not capture the full scope of women's self-efficacy in relation to a series of experiences of receiving Pap tests. In a study of the correlates of a lifetime Pap test among a community-based sample of 1,450 Vietnamese American women, the women who reported higher confidence in arranging a test, obtaining a Pap test, and managing the emotional stress caused by the test were more likely to have obtained their lifetime Pap tests (Ma et al., 2013). However, no study is known to have explored self-efficacy related to a series of experiences related to a Pap test among KA women. In addition, the association between cervical cancer self-efficacy and a Pap test within the previous two or three years has not been examined.

As no study has examined the role of self-efficacy in the context of cervical cancer in relation to health literacy, cervical cancer self-efficacy is based on empirical evidence supporting the association between cervical cancer self-efficacy and receipt of a Pap test. Thus, in this study, *cervical cancer self-efficacy* is a term used to describe one's ability to exercise control over her habits for a Pap test: (1) the confidence to receive a regular Pap test, (2) the confidence to obtain a prescription to receive a Pap test, (3) the confidence to make an appointment for a Pap test and receive the Pap test, and (4) the confidence to receive a follow-up Pap test based on screening recommendations.

## **Perceived Social Support**

Although social support has been defined and measured in several ways, several researchers have focused on the functional content of the relationship to assess one's perceived levels of social support from friends and family (House & Kahn, 1985; Weinert & Brandt, 1987). A large body of literature has examined social support as a key construct of health-related behaviors and outcomes, such as self-care among patients with diabetes (e.g., Idalski C., Ellis, Weisz, & Naar-King, 2011; Osborn & Egede, 2012), with hypertension (J. E. Lee et al., 2010), and with depression (e.g., Han, Kim, Lee, Pistulka, & Kim, 2007; M. T. Kim, Han, Shin, Kim, & Lee, 2005); however, inconsistent findings have been reported depending on how a study conceptualizes and measures social support and its context. In the context of cervical cancer control, unlike the previous studies, a series of studies support the notion that social support is associated with receipt of a Pap test (Juon et al., 2003; Luszczynska, Durawa, Scholz, & Knoll, 2012; Taylor et al., 2004). Juon et al. (2003) reported that KA women who have friends or family members receiving a Pap test were almost twice as likely to receive a regular Pap test (annual Pap test as well as Pap test within two years) among 459 Korean community sample aged 40 or older. An international study in Poland also found that women with higher perceived social support (i.e., feeling loved or supported) were more likely to have higher intentions to receive a Pap test (Luszczynska et al., 2012).

Although von Wagner's health literacy and health action framework did not mention social support as a volitional variable (von Wagner et al., 2009), a growing body of studies has focused on the role of social support that enables an individual to translate health information into health behaviors (Fransen, von Wagner, & Essink-Bot, 2012; Ussher, Ibrahim, Reid, Shaw, & Rowlands, 2010). Thus, in addition to the psychosocial determinants hypothesized in the

framework—cervical cancer knowledge, decisional balance for a Pap test, worry related to cervical cancer examination, and cervical cancer self-efficacy—the perceived social support (functional components of social support) is tested as one of the potential mediating factors on the basis of empirical evidence. This evidence supports the reinforcing effect of health-related behaviors, such as receipt of a Pap test (Luszczynska et al., 2012) and self-care in diabetes derived from the health literacy and health action framework (Fransen et al., 2012). Thus, in this study, *social support* is a term used to describe a woman's perceived social support, including feeling important, loved, and supported by family and friends, and having a confidant.

### **Summary**

This cross-sectional correlational study examined the mechanisms by which health literacy is associated with Pap test use and explored decision making about a Pap test among a sample of KA women 21-65 years of age residing in the Baltimore-Washington Metropolitan Area. Potential mediators such as motivational and volitional factors that link health literacy and Pap test use were operationalized through measures of cervical cancer knowledge, perceived barriers to and benefits of Pap test use (decisional balance), worry related to cervical cancer examination, cervical cancer self-efficacy, and perceived social support. A qualitative investigation was made to understand how Korean American women make a decision about a Pap test. This effort lays the groundwork for developing a tailored intervention to promote Pap test use among KA women, which in turn could reduce the cervical cancer disparity experienced by these women.

### **Dissertation Organization**

This dissertation is organized into five chapters and includes three manuscripts. Chapter One provides the introduction to the dissertation, significance of the study, specific aims and

hypotheses, review of relevant literature specific to study aims, and the conceptual model for the study. Chapter Two (Manuscript One) is a comprehensive literature review of studies which examines potential links between health literacy and cervical cancer screening. The review was published online on June 18, 2015, and the citation is as follows: Kim, K., & Han, H.R. (2015). Potential links between health literacy and cervical cancer screening behaviors: A systematic review. *Psycho-Oncology*. doi: 10.1002/pon.3883. Chapter Three (Manuscript Two) is a result manuscript that provides the quantitative results of the study, addressing Specific Aim One. The target journal of this manuscript is *Patient Education and Counseling*. Chapter Four (Manuscript Three) is a results manuscript that provides the qualitative results of the study, addressing Specific Aim Two. The target journal of this manuscript is *Medical Decision Making*. Chapter Five provides a summary of the findings from the dissertation work, reports the integration of both quantitative and qualitative study findings, and concludes with a discussion regarding the study's contributions and recommendations for future research.

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## **CHAPTER TWO: MANUSCRIPT ONE**

Potential links between health literacy and cervical cancer screening behaviors:

A systematic review

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Status: Published Online



## Abstract

**Objective:** The objective of this study is to critically appraise empirical evidence investigating pathways between health literacy (HL) and cervical cancer screening.

**Methods:** A comprehensive search was undertaken to identify English-language studies published before May 2014 that measured HL and cervical cancer screening. After screening for eligibility, we identified 12 articles that met inclusion criteria.

**Results:** Nine studies yielded a positive association between HL and cervical cancer screening. Five studies investigated the relationships between HL, psychosocial variables, and cervical cancer screening and found that HL was associated with cervical cancer knowledge (n=4) and cancer worry (n=2). Separately, cancer knowledge (n=2) and perceived barriers (n=1) were correlated with cervical cancer screening. One study investigated an indirect pathway of HL to cervical cancer screening through health knowledge, though the indirect pathway was non-significant. Overall, the investigations tended to focus on the print-related HL domain only and included only English- or Spanish-speaking women. In addition, the studies were limited by lack of theoretical basis (n=10), temporality (n=10), or use of self-reported screening status (n=7).

**Conclusion:** Evidence supports a positive link between HL and cervical cancer screening. There is only limited evidence to delineate indirect pathways linking HL and cervical cancer screening. Studies using a multidimensional validated measure of HL are needed in diverse groups of women, particularly those with a heightened burden of cervical cancer. With continuing cervical cancer disparities among culturally and linguistically diverse women, delineating *how* HL influences cervical cancer screening may help in the development of effective intervention strategies to reduce the disparities experienced by these women.

## **Introduction**

Cervical cancer is the fourth leading cancer in women worldwide: Every year approximately 528,000 women are diagnosed with cervical cancer, with an estimated 266,000 deaths per year, which accounts for 7.5% of all cancer deaths in women (Ferlay et al., 2015). Cervical cancer predominately affects women in countries with limited resources. About 85% of the global burden of cervical cancer and 87% of cervical cancer-related deaths occur in developing countries (Ferlay et al., 2015; World Health Organization, 2015).

While substantial progress has been made in controlling cervical cancer through early detection and well-established cervical cancer screening in developed countries (Arbyn, Raifu, Weiderpass, Bray, & Anttila, 2009; Vesco et al., 2011), few comprehensive national programs exist in developing countries such as Africa (Binagwaho et al., 2013). Given the lack of infrastructure for systematic cervical cancer control, the rates of Papanicolaou (Pap) tests tend to be very low in less-developed countries. For example, in Nigeria, where cervical cancer remains the second most common cancer for women (World Health Organization, 2014b), approximately 90% of women report never being screened (Dim, Nwagha, Ezegwui, & Dim, 2009; Hyacinth, Adekeye, Ibeh, & Osoba, 2012). In developed countries such as the U.S., inequality in cervical cancer screening remains among certain groups of culturally and linguistically diverse (CALD) women. For example, recent immigrant groups, such as Korean and Vietnamese women—two of the fastest growing immigrant populations in the U.S. (Ryan, 2013)—have almost twice the risk of developing cervical cancer compared to non-Hispanic white Americans (Miller, Chu, Hankey, & Ries, 2008; Wang, Carreon, Gomez, & Devesa, 2010), while having the lowest rate of Pap test use within the past three years (63% and 69%, respectively vs. 89% in white Americans and 92% among African Americans) (Centers for Disease Control and Prevention [CDC], 2004;

McCracken et al., 2007). Human papillomavirus (HPV) infection is a cause of cervical cancer with two types of HPV (16 and 18) and accounts for more than 70% of cervical cancer cases (Walboomers et al., 1999). Although HPV testing has recently been launched as a primary screening for cervical cancer in the U.S., receiving a Pap test on a regular basis is still the most commonly used prevention strategy for cervical cancer worldwide (CDC, 2012; Public Health England, 2013). Hence, we will consider cervical cytology (i.e., Pap test) as cervical cancer screening.

In addition to public health programs, the literature suggests systematic correlates of cervical cancer screening behaviors among CALD women such as recommendations from healthcare providers, health insurance, and access to healthcare (Bazargan, Bazargan, Farooq, & Baker, 2004; Ma et al., 2012; Peltzer & Phaswana-Mafuya, 2014). Han et al. (2011) reported that cervical cancer screening behaviors among racial/ethnic minorities in the U.S. tend to increase when navigation services are combined. Nevertheless, implementing top-down approaches without considering contextual factors, such as social inequalities within the community, may not result in the desired health behaviors among CALD. For example, in a U.S.-based study of the relationship between perceived discrimination and Pap tests (Gonzales, Harding, Lambert, Fu, & Henderson, 2013), Asian Indian women with perceived racial discrimination were nearly three times more likely to be out-of-date on their Pap tests compared with their non-discrimination counterparts (odds ratio 2.64, 95%CI 1.13-6.18), after controlling for demographic characteristics. Likewise, sociodemographic inequalities (e.g., gender) can keep women from seeking cervical cancer screening in developing countries (World Health Organization, 2014a). These findings call for more attention to the needs of CALD.

Most recently, health literacy—“the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions” (Ratzan & Parker, 2000)—has emerged as a potential determinant of cervical cancer screening (Corrarino, 2013; Flores & Acton, 2013). CALD populations in the U.S. are particularly affected by limited health literacy. For example, the 2003 National Assessment of Adult Literacy (NAAL) showed that 65% of Hispanics have basic or below basic health literacy, which is a much higher proportion than that of non-Hispanic whites (28%) (Kutner, Greenberg, Jin, & Paulsen, 2006). Likewise, researchers also found that a considerable amount of recent Asian immigrant groups speaking languages other than English have difficulty understanding basic medical words (nearly 75% of Koreans) (Han, Kim, Kim, & Kim, 2011) or written information from their doctors and instructions on a prescription bottle (about 70% of Chinese) (Sentell & Braun, 2012).

Health literacy is suggested as a crucial skill set which enables an individual to navigate the healthcare system to obtain needed care such as cancer screening (Nutbeam, 2000); however, specific pathways through which health literacy influences screening behavior (i.e., *how*) are still not completely understood. Three recent systematic reviews that evaluated the relationship between health literacy and cervical cancer screening (Corrarino, 2013; Flores & Acton, 2013; Oldach & Katz, 2014) found mixed evidence. Furthermore, previous reviews neither exclusively targeted cervical cancer screening (Corrarino, 2013; Oldach & Katz, 2014) nor included a diverse sample of women other than older Hispanics (Flores & Acton, 2013), resulting in limited reviews of only a few studies pertaining to cervical cancer screening.

A growing number of health literacy studies have been published in the context of cervical cancer screening since the previous reviews completed their literature search (up to

2011). The field is also advancing, with more comprehensive health literacy-specific theoretical frameworks (Dageforde & Cavanaugh, 2013; Sorensen et al., 2012). For example, in the context of chronic disease management such as diabetes, researchers have identified significant alternative (indirect) pathways between health literacy and disease outcomes (Osborn, Cavanaugh, Wallston, & Rothman, 2010) through psychosocial constructs such as self-efficacy. Yet, to the best of our knowledge, no attempt has been made to examine empirical evidence pertaining to the ways in which health literacy impacts cervical cancer screening. The objectives of this systematic review are two-fold: (1) to critically evaluate empirical evidence delineating potential pathways linking health literacy to cervical cancer screening behavior, and (2) to suggest recommendations for future research on health literacy and cervical cancer screening.

## **Methods**

### **Literature Search**

We searched electronic databases and conducted hand searches of reference collections. Electronic databases—PubMed, Embase, and the Cumulative Index to Nursing and Allied Health Literature (CINAHL)—were used to search for potential studies. After consulting with a health science librarian, we used a combination of the following keywords that included MeSH terms (see Appendix A for list of search terms): “health literacy” or “numeracy” or “literacy,” and “Pap smear,” or “cervical cancer screening.” The searches were limited to studies published in English before May 2014. The hand search was done in reference collections from the articles extracted from electronic databases.

### **Study selection process**

The article selection process is illustrated in Figure 1. Initially, 215 articles were retrieved from the electronic database search, after discarding 93 duplicate articles. Four additional articles

were identified from a hand search in reference collections. One author (KHK) reviewed titles and abstracts on their relevance to women's cervical cancer screening behavior. Of 219 articles, 49 articles were passed on for a full-text review. After title and abstract screening, two authors (KHK & HRH) independently reviewed full-text articles to select studies for review using the following inclusion criteria: (1) quantitative English language primary studies (e.g., data-based articles) published in peer-reviewed journals, (2) cervical cancer screening behavior measured as a study variable, and (3) health literacy quantitatively measured as a study variable. We excluded 37 articles for the following reasons: (1) no data-based article (review, editorial; n = 7), (2) articles for which full-texts were not available (conference abstracts; n = 6), (3) qualitative research (n = 3), (4) no Pap test receipt as a study variable (n=1), and (5) no health literacy as a study variable (n = 20). After discussion between two reviewers, agreement was reached to include a total of 12 articles that met the inclusion criteria.

[Insert Figure 1 here]

### **Quality appraisal tool**

While there is a lack of consensus regarding ways to critically appraise observational studies (Sanderson, Tatt, & Higgins, 2007), the STrengthening the Reporting of OBservational studies in Epidemiology (STROBE) guidelines were used to evaluate the methodological rigor of each study included in the review (Vandenbroucke et al., 2007). STROBE is a checklist on what authors should report on an observational study (Vandenbroucke et al., 2007). The STROBE statement is one of the most widely used quality-rating checklists in biomedical research, with appraisal items tailored to cross-sectional and cohort studies (Vandenbroucke et al., 2007). Using seven items on the STROBE that were relevant to methodological rigor, two reviewers

independently evaluated methodological rigor of the studies. Any discrepancies were discussed until consensus was reached.

### **Quality appraisal of the selected studies**

As shown in Table 2.1, only a few studies adequately described a study design ( $n = 4$ ). A majority of the studies provided clear descriptions about sample selection criteria and response rate, though none reported a sample size based on power analysis. Some studies ( $n = 3$ ) reported a low response rate (from 19% to 51%). More than half of the studies ( $n = 7$ ) determined a woman's cervical cancer screening status based solely on self-report. While most studies used established health literacy measures such as the Test of Functional Health Literacy in Adults (TOFHLA), the Rapid Estimate of Adult Literacy in Medicine (REALM), or the NAAL, some studies that used cancer-specific health literacy tools such as Cancer Message Literacy Test (CMLT) (Mazor et al., 2014) and Cervical Cancer Literacy Assessment Tool (CCLAT) (Roman et al., 2014) did not offer clear descriptions of what was measured to evaluate an individual's health literacy. Overall, limited evidence was provided regarding psychometric properties of each measure in the study population. While all the studies used an adequate statistical analysis method consistent with the study design, most ( $n = 10$ ) reported controlling for covariates (e.g., age, education, insurance) in looking at the relationship between health literacy and cervical cancer screening; however, the selection of covariates tended not to be guided by a theoretical framework ( $n = 10$ ).

## **Results**

### **Characteristics of studies**

The characteristics of studies selected for this review are summarized in Table 2.2. All but one (Lee, Tsai, Tsai, & Kuo, 2012) were conducted in the U.S. Only two were longitudinal

(Garbers, Schmitt, Rappa, & Chiasson, 2010; Lindau, Basu, & Leitsch, 2006); ten were cross-sectional. Study participants were recruited predominantly from the following settings: clinics (Garbers et al., 2010; Lindau et al., 2002; Lindau et al., 2006; Schapira et al., 2011), followed by a household registration system (Lee et al., 2012; White, Chen, & Atchison, 2008), and a national managed care organization (Medicare) (Cho, Lee, Arozullah, & Crittenden, 2008; Scott, Gazmararian, Williams, & Baker, 2002). The sample consisted of predominantly white American (>60%) and middle-aged women (age ranging from 18 to 79). All U.S.-based studies but one (Roman et al., 2014) included either English- or Spanish-speaking participants. Only one investigated the association between health literacy and cervical cancer screening by ethnicity or origin of nationality (Roman et al., 2014).

While current routine cervical cancer screening guidelines for women are limited to those 65 years of age and younger in the U.S. (CDC, 2012), three U.S.-based studies included women older than 65 (Cho et al., 2008; Roman et al., 2014; Scott et al., 2002); thus, findings from studies involving women 65 years of age or older may not be applicable to women who need routine cervical cancer screening. The duration of adherence to cervical cancer screening guidelines (i.e., Pap tests) used in the studies varied from yearly (Bynum et al., 2013; Lindau et al., 2006; White et al., 2008) to once in their lifetime (Lindau et al., 2002; Scott et al., 2002), making direct comparisons of Pap test prevalence across studies difficult. These variations might be associated with the following: (1) changes in the recommended guidelines over time, (2) inconsistencies among the agencies that publish cancer screening guidelines (CDC, 2012), and (3) sample characteristic differences, ranging from women with HIV (Bynum et al., 2013) to a nationally representative sample of women (Lee et al., 2012; White et al., 2008). Nevertheless, the prevalence of receipt of Pap tests in the preceding one to three years ranged from 62% to



92%, whereas lifetime prevalence was estimated at 95% (Garbers & Chiasson, 2004; Lindau et al., 2002; Scott et al., 2002).

### **Measuring health literacy**

All but three studies used only print health literacy (Bynum et al., 2013; Cho et al., 2008; Garbers & Chiasson, 2004; Garbers et al., 2010; Lee et al., 2012; Schapira et al., 2011; Scott et al., 2002; White et al., 2008). Two studies measured cancer-specific health literacy (Mazor et al., 2014; Roman et al., 2014), while the rest used generic health literacy tests. The two most common print health literacy measures used in the studies (both generic) were the TOFHLA—which included the Short TOFHLA (s-TOFHLA) (Cho et al., 2008; Scott et al., 2002) and the TOFHLA-Spanish (TOFHLA-S) (Garbers & Chiasson, 2004; Garbers et al., 2010)—and the REALM (Lindau et al., 2002; Lindau et al., 2006; Schapira et al., 2011). Additional print health literacy measures included the following: CMLT–reading (Mazor et al., 2014), the NAAL (White et al., 2008), the Mandarin Health Literacy Scale (MHLS) (Lee et al., 2012), the Single Item Literacy Screener (SILS) (Bynum et al., 2013), CCLAT (Roman et al., 2014), and Lipkus numeracy scale (Schapira et al., 2011). Comprehension of spoken messages associated with cancer prevention and screening (CMLT-listening) (Mazor et al., 2014) and physician-rated literacy (Lindau et al., 2002; Lindau et al., 2006) were also measured, in addition to print health literacy measures. Prevalence of below-adequate (below basic to basic level) health literacy ranged from 29% to 51% across the studies, although one study (Mazor et al., 2014) only offered mean correct scores without categorizing individuals according to predetermined scale cutoff points. Although it is challenging to directly compare the proportion of women with inadequate health literacy across studies due to the various types of health literacy measures used in their sample, the levels of health literacy tended to be lower in studies involving predominantly

African American women (35% to 51%) (Bynum et al., 2013; Cho et al., 2008; Lindau et al., 2002; Lindau et al., 2006) or Latina (38% to 49%) (Garbers & Chiasson, 2004; Garbers et al., 2010) as opposed to studies with predominantly non-Hispanic white American women (12% to 36%) (Schapira et al., 2011; Scott et al., 2002; White et al., 2008).

### **Relationship between health literacy and cervical cancer screening**

Eleven studies examined the association between health literacy and cervical cancer screening behavior; one study (Lindau et al., 2002) found that all but 5 women in the study sample had received a Pap test in their lifetime; hence, the studies did not examine the relationship between health literacy and cervical cancer screening (Table 2.3). Of the eleven studies, nine found a significant positive correlation between health literacy and Pap test receipt (Bynum et al., 2013; Cho et al., 2008; Garbers & Chiasson, 2004; Lee et al., 2012; Lindau et al., 2006; Mazor et al., 2014; Roman et al., 2014; Scott et al., 2002; White et al., 2008) across ethnically diverse samples (predominantly non-Hispanic white, African, and Hispanic American women) and different time periods in measuring Pap tests (within the last year to a lifetime). Notably, six out of the nine studies measured a functional measure of print health literacy using the TOFHLA, the NAAL, and the SILS (Bynum et al., 2013; Cho et al., 2008; Garbers & Chiasson, 2004; Lee et al., 2012; Scott et al., 2002; White et al., 2008). Of the six studies, one international study of Taiwanese women (N = 1,754) (Lee et al., 2012) found a significant association between health literacy and receipt of a Pap test that existed only at the bivariate level. However, given that the Taiwanese healthcare system is different from that of the U.S.—Taiwanese women 30 years of age and older get free annual Pap tests through national health insurance—and that Taiwanese women are less likely to face a language barrier, it is difficult to make a direct comparison between U.S. studies and studies conducted outside the U.S.

One of three remaining studies (Mazor et al., 2014) found that comprehension of spoken messages (CMLT-listening), not reading health literacy (CMLT-reading), was a predictor of Pap tests within the preceding 39 months among insured women. In a study by Lindau et al. (Lindau et al., 2006), REALM-based literacy was not associated with whether or not women who had abnormal Pap test results received a follow-up Pap test within one-year; however, physician ratings of their patients' literacy was predictive of the women's follow-up within one year (odds ratio [OR] 13.6; 95% confidence interval [CI] 2.9-64.9). In the study, physician-estimated literacy had low sensitivity (40%) but relatively high specificity (76%) in detecting inadequate health literacy based on participant responses on the REALM, indicating that the physicians tended to overestimate their patients' reading levels. The remaining study (Roman et al., 2014) included ethnically diverse (African, Arab, and Hispanic) women and found that African American women at risk for low health literacy (<75% performance on the CCLAT, not knowing a family cancer history, and no high school diploma) had 50% lower odds of obtaining cervical cancer screening in the past three years in comparison to those with adequate health literacy (95% CI 0.34-0.73).

Two studies (Garbers et al., 2010; Schapira et al., 2011) failed to show a significant positive correlation between health literacy and Pap test receipt. The lack of association may have to do with sample selection or measurement error. For example, Garbers et al. (Garbers et al., 2010) recruited their study sample of Latina women from those who sought breast or cervical cancer screenings at the National Breast and Cervical Cancer Early Detection Program in New York City. Given that all women in the program received case management as usual care (resulting in all but six women in the sample receiving a Pap test), the authors argued that barriers to cancer screening resulting from limited health literacy might have been mitigated

once they approached the healthcare setting (Garbers et al., 2010). Another study (Schapira et al., 2011) did not find any direct link between health literacy (measured by REALM and Lipkus numeracy) and screening behavior. In the study, cervical cancer screening was included as part of a composite score encompassing three different cancer screening tests—breast, cervical, and colorectal—due to multiple cancer eligibilities for each study participant. In addition, not only did the study have a significantly low response rate (19%), but about one-fourth of study participants were also excluded in the final analysis due to missing information about cancer screening, limiting the statistical validity of the findings.

### **Potential psychosocial mediators between health literacy and cervical cancer screening**

As shown in Table 2.3, several psychosocial variables were examined in relation to health literacy and cervical cancer screening, with knowledge being the most common. Four studies measured knowledge specific to cervical cancer (Bynum et al., 2013; Garbers & Chiasson, 2004; Lindau et al., 2002) or screening guidelines for breast, cervical, and colorectal cancer (Schapira et al., 2011), whereas one study asked general health knowledge (Lee et al., 2012). Of five studies that examined knowledge in relation to health literacy, four found a significant association between health literacy and knowledge (Garbers & Chiasson, 2004; Lee et al., 2012; Lindau et al., 2002; Schapira et al., 2011). Bynum et al. (Bynum et al., 2013) found no significant association between health literacy and cervical cancer knowledge among women with HIV. It is notable that two studies used open-ended questions to measure cervical cancer knowledge without any scoring instruction (Garbers & Chiasson, 2004; Lindau et al., 2002). In addition, of the four studies that found a significant association, three used bivariate analysis (Garbers & Chiasson, 2004; Lee et al., 2012; Schapira et al., 2011); only one study controlled for

known demographic covariates of health literacy (age, education, insurance, and employment) (Lindau et al., 2002).

Two studies reported that health literacy was significantly negatively associated with cancer worry (Lindau et al., 2002; Schapira et al., 2011). For example, Lindau et al. (Lindau et al., 2002) found that women with below-adequate health literacy were more likely to state that they would worry or panic and would not seek medical care, compared to those who had adequate health literacy. Likewise, Schapira et al. (Schapira et al., 2011) found that lower health literacy (numeracy) was associated with higher levels of cancer worry. Although the authors investigated the association between health literacy and other Health Belief Model (HBM) constructs (perceived barriers, perceived benefits, and perceived susceptibility), they found non-significant correlations (Schapira et al., 2011). Instead, Schapira et al. (2011) found direct associations of higher knowledge (OR 1.06; 95%CI 1.02–1.08) and lower perceived barriers (OR 0.93; 95%CI 0.92–0.95) with cancer screening (breast, cervical, colorectal cancer) in multivariate models, but found no direct association between cancer worry and cancer screening.

Only one study (Lee et al., 2012) conducted in Taiwan systematically investigated a mediating effect of health knowledge on the relationship between health literacy and receipt of Pap tests. Despite health literacy and health knowledge being correlated to cervical cancer screening in bivariate analyses, health knowledge was not a significant mediator after controlling for age, education, income, and residence status (Lee et al., 2012). No other studies examined potential alternative pathways linking health literacy to cervical cancer screening behavior through psychosocial variables.

## **Discussion**

To the best of our knowledge, this is the first systematic review focusing on possible indirect pathways linking health literacy to cervical cancer screening. We found that most studies included in the review primarily tested a direct association between health literacy and cervical cancer screening behavior and that there was insufficient evidence to support indirect pathways between health literacy and cervical cancer screening. A possible indirect link of health literacy to cervical cancer screening was suggested through cervical cancer knowledge, but more research is warranted to confirm this pathway.

A more theoretically grounded systematic approach is essential to better explain how health literacy and other social determinants affect screening behavior, thereby informing tailored interventions to underserved women. For example, a framework of health literacy and health actions (von Wagner, Steptoe, Wolf, & Wardle, 2009) suggests that the relationship between health literacy and health actions (e.g., access to and use of healthcare such as cancer screening) can be mediated by knowledge, beliefs, or self-efficacy. This framework has been partially tested in one international study (Lee et al., 2012) in which low health literacy was associated with low cervical cancer knowledge which then led to poorer cervical cancer screening. For the education to be effective, increasing a woman's health literacy may be a first step towards promoting cervical cancer screening before implementing intensive knowledge education about the cancer. Another recent framework proposed by von Wagner and colleagues (von Wagner, Good, Whitaker, & Wardle, 2011) suggests that other social determinants beyond health literacy such as education, life stress, and illness experience influence non-participation in cancer screening through fatalistic beliefs, perceived benefits, and self-efficacy. The framework (von Wagner et al., 2011) has been tested in studies within the context of colorectal cancer

screening. For example, in the Miles et al. study (Miles, Rainbow, & von Wagner, 2011), cancer fatalism mediated the relationship between socioeconomic status (income, educational levels) and colorectal cancer screening. Taken together, these frameworks offer potential intervention strategies to consider in promoting cervical cancer screening among CALD women. For example, implementing programs to eliminate disparities in educational opportunities across the life span (von Wagner et al., 2011) could be a basis to empower CALD women to seek preventive health services such as cervical cancer screening. In particular, life-long learning and skills attainment in the context of women's health combined with culturally embedded approaches (e.g., mitigating fatalistic myths about cervical cancer within the community) could help CALD women build a cognitive skill set (e.g., health literacy) that is necessary to engage in cervical cancer screening (von Wagner et al., 2009).

Health literacy is conceptualized as having multiple dimensions such as oral, reading, comprehension, and numeracy (Baker, 2006; Nutbeam, 2008; Roter, 2011). Yet, most studies included in this systematic review addressed only one domain of health literacy such as reading ability or comprehension. A functional measure (e.g., comprehension) of print health literacy was consistently associated with cervical cancer screening [38, 43-47], whereas the association between reading ability (i.e., REALM) and cervical cancer screening appeared to be weak (Lindau et al., 2006; Schapira et al., 2011). We found only three studies that simultaneously measured two sub-domains of health literacy such as comprehension of spoken messages (CMLT-listening, physician-rated literacy) and numeracy, in addition to reading ability (CMLT-reading and REALM) (Lindau et al., 2006; Mazor et al., 2014; Schapira et al., 2011). Comprehension of spoken messages correlated well with cervical cancer screening (Lindau et al., 2006; Mazor et al., 2014), whereas numeracy was not a key domain of health literacy in the

context of cervical cancer screening in the study included in this review (Schapira et al., 2011). Numeracy has been shown to be a particularly critical dimension of health literacy for certain health behaviors. For example, in the case of type 2 diabetes, numeracy—not reading ability (REALM)—was associated with self-efficacy in managing the disease (Osborn et al., 2010). Taken together, there have been limited efforts to understand whether a particular dimension of health literacy plays a more critical role than others in utilization of cancer screening. Future research should investigate the role of different dimensions of health literacy in relation to cervical cancer screening.

The studies included in the review mainly targeted English-speaking individuals in the U.S.; thus, those who do not speak English as their primary language in the U.S.—although they are particularly affected by limited health literacy (Han et al., 2011; Sentell & Braun, 2012)—and women in less developed countries tended to be excluded from the studies. The findings suggest a strong need for inclusion of diverse ethnic groups of women in research on health literacy in relation to cervical cancer screening, thereby helping the women benefit from such research. More than 25 million non-English speaking individuals reside in the U.S. Given this national demographic trend—that notably, the proportion of the non-English speaking individuals has dramatically increased by 81% over the past 20 years (Whatley & Batalova, 2013)—more attention should be paid to limited health literacy and its impact on cancer screening behavior among high-risk groups such as individuals with limited English proficiency.

The methodological quality of the studies should be taken into account when interpreting the study findings. For example, most of the studies were cross-sectional; therefore, the links between health literacy, psychosocial variables, and cervical cancer screening behavior discussed in this present review do not imply causation. In addition, there were a number of



methodological issues that might have resulted in the mixed study findings: sample selection bias, lack of statistical power due to a small sample size, lack of theory-guided selection of study variables, limited evidence of psychometric properties of health literacy measures used, and reliance on self-reported cervical cancer screening status. For example, the study samples were mainly recruited from clinics and included predominantly white American (>60%) and English- or Spanish-speaking women. Thus, the findings may not be applicable to women who are not within the healthcare system or those who do not speak English or Spanish as their primary language. In addition, the ceiling effect in the health literacy measure (65% to 88% in women having an equal to or greater than 9<sup>th</sup> grade reading level) observed among clinic-based study participants in two studies (Lindau et al., 2006; Schapira et al., 2011) also supports a possibility of selection bias. Lack of psychometric information of health literacy measures used in the study samples also requires caution when interpreting the findings. Studies have demonstrated that self-reported Pap test rates tend to be overestimated with varying degrees of agreement rates (70% to 87%) with the receipt of Pap tests based on medical records (Caplan et al., 2003; McGovern, Lurie, Margolis, & Slater, 1998). Taken together, these findings suggest the need for theory-guided, systematic research with an adequately calculated sample size to examine health literacy in relation to psychosocial variables and cervical cancer screening in a more diverse sample of women, using a reliable and valid health literacy measure.

This systematic review has some limitations. First, despite a thorough electronic search of references using three comprehensive databases in addition to hand searches, it is possible that we missed relevant articles. We conducted a systematic search using appropriate MeSH terms after consulting with an experienced health science librarian to minimize this chance. Second, we only included quantitative studies that used a health literacy measure (either established, such as

the REALM and the TOFHLA, or developed for the purpose of our study using a composite score) to be able to evaluate the link between health literacy and cervical cancer screening. This approach might have resulted in a relatively small number of studies included in this review.

Third, the review was limited to studies focusing on cervical cancer screening, hence limiting the generalizability of the findings to other types of cancer screening. Even though we included a few studies that used cervical cancer screening as part of a composite score of cancer screening in general, it is possible that the mechanism of utilizing cervical cancer screening might be different from that of other preventive services such as breast or prostate cancer screening.

Fourth, while the current national practice guidelines for cervical cancer screening recommend that women 21 to 65 years of age at average risk receive cervical cancer screening at least every three years (CDC, 2012), the duration of adherence to cervical cancer screening varied from the preceding one year to a lifetime, making direct comparisons across studies difficult. Future research should address this issue by measuring participants' cervical cancer screening behavior consistent with national practice guidelines.

### **Conclusion**

Poor adherence to cervical cancer screening guidelines results in significant disparities in cervical cancer incidence and mortality rates among CALD women. The findings of this systematic review could be the first piece of the puzzle in linking health literacy to cervical cancer screening through more refined pathways. We found sufficient evidence to support a positive direct association between health literacy and receipt of Pap tests across different ethnic groups, though none of the studies examined the association in an Asian sample, except for an international study conducted in Taiwan. There were inconsistent findings in terms of the relationships between health literacy, psychosocial factors, and cervical cancer screening.

Evidence was limited to determining how health literacy actually influences cancer screening behavior, although limited research suggested a potential link between health literacy and cervical cancer screening through cervical cancer knowledge. Future research is warranted to examine whether the association between health literacy and cervical cancer screening can be better explained by alternative, indirect pathways as hypothesized in recent health literacy frameworks. Future research should also address methodological concerns as highlighted above and include more diverse populations in need of preventive health services.

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**Table 2.1** Methodological Quality of Studies on the Association between Health Literacy and Cervical Cancer Screening

Author (year)	Study design	Theory	Sample selection	Power analysis	Psychometric properties of health literacy measure	Outcome measure (cervical cancer screening)	Statistical Analysis
Bynum et al. (2013)	–	–	–	–	–	S	+
Cho et al. (2008)	–	–	+	–	–	S <sup>a</sup>	+ <sup>c</sup>
Garbers et al. (2004)	–	–	+	–	–	S <sup>b</sup>	+ <sup>c</sup>
Garbers et al. (2009)	–	–	+	–	–	O	+
Lee et al. (2012)	–	+	+	–	+	S	+ <sup>c</sup>
Lindau et al. (2002)	–	–	+	–	–	O	+ <sup>c</sup>
Lindau et al. (2006)	+	–	+	–	–	O	+ <sup>c</sup>
Mazor et al. (2014)	–	–	±	–	+	O	+ <sup>c</sup>
Roman et al. (2014)	+	–	±	–	–	S	+ <sup>c</sup>
Schapira et al. (2011)	+	+	+	–	–	S <sup>a</sup>	+
Scott et al. (2002)	+	–	+	–	–	S	+ <sup>c</sup>
White et al. (2008)	–	–	+	–	+	S	+ <sup>c</sup>

+ Clearly discussed and adequate, ± Insufficiently discussed, – Not discussed

S: self-reported, O: medical records

<sup>a</sup> Cervical cancer screening assessed as part of general cancer screening encompassing breast and colorectal.

<sup>b</sup> 10% of self-reports were randomly selected and compared with medical records.

<sup>c</sup> Controlled for covariates.

**Table 2.2** Summary of Findings from Studies on the Association between Health Literacy and Cervical Cancer Screening

Author (year)	Aim	Sample	Theory	Relevant measurements	Below-adequate HL	Screening completion	Main results
Bynum et al. (2013)	Examine the association between HL and CC knowledge and screening	145 women living with HIV in clinic- and community-based settings  Mean age: 46 AA: 90% High school graduate: 77% No insurance: NR Response rate: NR	None	HL: SILS  Psychosocial variable: tailored knowledge about CC and a Pap test for women living with HIV  Screening: self-reported (1) Pap tests during the first year after being diagnosed with HIV; (2) Pap test <1 year	- Defined: >2 (1-5) - 38%	(1) 36% (2) 81%	Women with high HL compared to women with low HL had: - No difference in CC knowledge - Higher frequency reporting the recent Pap test <1 year (86 vs. 75%; $\chi^2=3.94$ , $p=0.05$ ), while lower frequency reporting $\geq 2$ Pap tests during the first year after being diagnosed with HIV (30 vs. 49%; $\chi^2=8.19$ , $p=0.02$ )
Cho et al. (2008)	Examine the association among HL, health status and utilization, and intermediate factors including preventive care	385 English-speaking Medicare female enrollees aged $\geq 65$ with $\geq 1$ outpatient clinic visit at the medical centers  Mean age: NR AA: 59% Mean education: high school Response rate: 51%	None	HL: s-TOFHLA  Psychosocial variable: not measured  Screening: (1) self-reported preventive care including FOBT or mammogram and/or Pap tests <2 years	- Defined: <23 (0-36) - 51%	(1) 86%	HL was positively associated with use of preventive care ( $\beta=0.42$ , $p<0.05$ ) controlling for sex, ethnicity, and education
Garbers et al. (2004)	Examine the association between HL and CC screening knowledge and behavior	205 Spanish-speaking Latinas aged $\geq 40$ referred by their relatives approached in women's health center  Mean age: 51 Birthplace: South Africa 41% Dominican Republic 19% Puerto Rico 14% High school graduate: 31% No insurance: 58% Response rate: 78%	None	HL: TOFHLA-S  Psychosocial variable: knowledge about purpose of Pap tests, how to perform Pap tests; and risk factors for CC using open-ended questions  Screening: self-reported (1) lifetime Pap tests and (2) Pap test <3 years (10% were reviewed in medical records)	Inadequate: Defined: <60 (0-100) - 30%  Marginal: Defined: 60-74 - 19%	(1) 92% (2) 77%	Adequate HL was associated with describing: - how to perform (OR= 5.55; 95%CI: 2.71-11.36) and the purpose (OR=2.69; 95%CI: 1.39-5.19) of Pap tests  Adequate HL compared to inadequate HL was positively associated with - lifetime Pap test use (AOR 16.67; 95%CI: 1.82-100.00), controlling for age, education, years of residency in USA, insurance, and a source of care -Pap test use <3 years (OR 2.94; 95%CI: 1.41-5.88)
Garbers et al. (2009)	Examine the association between HL and follow-up (e.g., Pap tests) after mammogram	310 Spanish-speaking Latinas aged $\geq 40$ seeking breast and/or CC screening at the NBCCEDP clinics  Mean age: 51 Birthplace: Dominican Republic 67% South Africa 18% High school graduate: 52% No insurance: 99% Response rate: 92%	None	HL: TOFHLA-S  Psychosocial variable: not measured  Screening: chart abstracted (1) a Pap test after having mammogram and (2) Pap test use <60 days	Inadequate: Defined: <60 (0-100) - 24% Marginal: Defined: 60-74 - 14%	(1) 98% (2) 75% Inadequate: 85% Marginal: 76% Adequate: 71%	Of those referred for a Pap test ( $n=310$ ) <sup>a</sup> , women with below-adequate HL were more likely to have Pap tests <60 days (the program reporting requirements) of their mammogram (AOR 2.27; 95%CI 1.13-4.60), controlling for enrollment on Saturday (both Pap tests and mammograms were readily available).

(Continued)

**Table 2.2 (Continued)**

Author (year) Study design	Aim	Sample	Theory	Relevant measurements	Below-adequate HL	Screening completion	Main results
Lee et al. (2012)	Examine the association between HL and Pap tests and examine if the association is mediated by health knowledge	1,754 Taiwanese women aged ≥18 completed a national survey in Taiwan	HLHA	HL: MHLS  Psychosocial variable: health knowledge  Screening: (1) self-reported receipt of a Pap test < 2 years for women aged 30 and older	Inadequate: - Defined: <31 (0-50) - 16% Marginal (%) - Defined: 31-42 -13%	(1) 62%	HL was positively associated with - Pap test < 2 years ( $\gamma = 0.13$ , $p < 0.001$ ) - health knowledge ( $\gamma = 0.54$ , $p < 0.001$ )  - No association between HL and Pap test use controlling for age, education, income, and residential location; - Association between HL and Pap tests was not mediated by knowledge
Lindau et al. (2002)	Examine the association between HL and CC knowledge	529 English-speaking women aged ≥18 in OB/GYN and HIV clinics  Median age (18-54): 27 AA: 58%, Hispanic: 18% WA: 14% High school graduate: 47% No insurance: 8% Response rate: 91%	None	HL: REALM: physician-rated literacy  Psychosocial variable: knowledge about purpose of Pap tests and ways to minimize CC risk  Screening: (1) self-reported Pap tests in their life (medical records were reviewed)	REALM: - Median: 63 (0-66) - 39%  Physician-rated - 30%	(1) 99%	Women with adequate HL than those with below-adequate HL were - more likely to know about the purpose of Pap tests (AOR 2.25; 95% CI: 1.05-4.80) controlling for age, ethnicity, education, employment, and insurance; - less likely not to seek medical care rather worry and panic if received abnormal Pap results (19 vs. 30%, $p < 0.036$ )
Lindau et al. (2006)	Examine the association between HL and adherence to follow-up after an abnormal Pap test	68 English-speaking women aged ≥18 in OB/GYN and HIV clinics  <u>Women with adequate HL</u> : AA: 52% Hispanic: 21% High school graduate: 43% Medicaid: 64%  <u>Women with inadequate HL</u> : AA: 67% Hispanic: 29% High school graduate: 23% Medicaid: 92% Overall response rate: 91%	None	HL: REALM; physician-rated literacy corresponding to the REALM categories  Psychosocial variable: not measured  Screening: chart abstracted (1) on-time and (2) 1-year follow-up	REALM: - Defined: <61 (0-66) - 35%  Physician-rated - 41%	(1) 35% (2) 75%	REALM-based HL was not significantly associated with either on-time follow up or follow up within a year, controlling for age, HIV status, cancer, ethnicity, employment, and insurance  Physician-rated HL was positively associated with follow-up within a year (AOR 13.6; 95% CI: 2.9-64.9), controlling for covariates (except insurance)
Mazor et al. (2014)	Examine the association between two forms of HL—reading and listening—and Pap tests	527 English-speaking insured women aged 40-65 years in 4 Cancer Research Network sites  Mean age: NR WA: 42% Hispanic: 18% AA: 18%, API: 14% ≥Bachelor degree: 45% Response rate: NR	None	HL: CMLT-Listening; CMLT-Reading  Psychosocial variable; not measured  Screening: chart abstracted (1) receipt of a Pap test <39 months	Mean CMLT-listening: 79.1±13.7  Mean CMLT-reading: 84.0±14.1	(1) 75%	Women with the top quartile of the CMLT-listening are twice as likely to receive a Pap test <39 months compared to those with the bottom quartile (AOR=2.0; 95%CI: 1.09-3.66), controlling for site and age  CMLT-reading was not associated with Pap test use

(Continued)

**Table 2.2 (Continued)**

Author (year) Study design	Aim	Sample	Theory	Relevant measurements	Below-adequate HL	Screening completion	Main results
Roman et al. (2014)  Cross-sectional	An exploratory analysis of baseline data to examine the association between co-occurring risk factors and CC screening adherence	514 AA, Arab, and Hispanic women aged 21-70 years who participated in a RCT of Kin Keeper  Age ≥50: 32% AA: 42%, Arab: 45%, Hispanic: 13% High school graduate: 70% No insurance: 34% Response rate: NR	None	HL: HL risks score (a sum of three binary indicators such as low CCLAT, not knowing a family cancer history, and less than high school completion)  Psychosocial variable: not measured  Screening: (1) self-reported Pap tests <3 years	- Defined: <75 (0-100) - AA: 60% - Arab: 65% - Hispanic: 71%	AA: 83% Arab: 71% Hispanic: 68%	HL risks score was significantly associated with Pap test receipt <3 years among AA (AOR 0.50; 95%CI: 0.34-0.73), not Hispanic and Arab women, controlling for age, marital status, a doctor recommendation, competing priorities risk score, health risk score, and system risk score <sup>b</sup>
Schapira et al. (2011)  Cross-sectional	Examine the association between numeracy and cancer screening (breast, cervical, and colorectal cancer screening)	269 English-speaking female patients aged 40-65 years in primary care clinics  Mean age: 59 WA: 70% AA: 27% High school graduate: 72% No insurance: 3% Response rate: 19%	HBM	HL (numeracy): Lipkus numeracy scale; REALM  Psychosocial variable: cancer screening knowledge; perceived cancer risk and worry; benefits; and barriers  Screening: self-reported cancer screening including Pap tests <3 years, mammograms <2 years, and/or FOBT <1 year	Mean numeracy (0-11): 7.5±2.7  REALM: - Defined: <61 (0-66) - 12%	92%	Higher HL was related with - Increased cancer screening knowledge (Spearman: 0.26; 95%CI: 0.16-0.35) - Lower cancer worry (p<0.0001), controlling for cancer screening knowledge and REALM  Knowledge (ARR 1.06; 95%CI: 1.02-1.08) and perceived barriers (ARR 0.93; 95%CI:0.92-0.95) were related with cancer screening, controlling for cancer type and clustering
Scott et al. (2002)  Cross-sectional	Examine the association between HL and utilizations of preventive healthcare including CC screening	1546 either English- or Spanish-speaking new female Medicare managed care enrollees aged 65-79 years  Mean age: 71 WA: 74%, AA: 12%, Hispanic: 12% High school graduate: 65% Response rate: 44%	None	HL: s-TOFHLA  Psychosocial variable: not measured  Screening: self-reported (1) lifetime Pap test use	Inadequate: - Defined: <54 (0-100) - 20% Marginal: - Defined: 54-66 - 11%	(1) 94%	Compared to women with adequate HL, - Women with inadequate HL were more likely to report not receiving lifetime Pap tests (AOR=1.7, 95% CI: 1.0-3.1) - Women with marginal HL were more likely to report not receiving Pap tests (AOR 2.4; 95%CI: 1.2-4.7), controlling for age, ethnicity, education, income, # of physician visits, and MMSE scores

(Continued)



**Table 2.2 (Continued)**

Author (year)	Study design	Aim	Sample	Theory	Relevant measurements	Below-adequate HL	Screening completion	Main results
White et al. (2008)	Cross-sectional	To examine association between HL and preventive health practices including CC screening in the preceding year	6,495 either English- or Spanish-speaking national representative female adults aged $\geq 16$ (18-65 for Pap test analysis)  Mean age: 44 WA: 71%, AA: 11%, Hispanic: 12% High school graduate: NR No insurance: 18% Response rate: 62%	None	HL: NAAL <sup>c</sup>  Psychosocial variable: not measured  Screening: self-reported (1) receipt of a Pap test < 1 year	- Defined: $\leq 225$ (0-500) - 36%	(1) 69%	Lower HL was associated with a decreased probability of receiving a Pap test among women aged 18 to 39 years ( $\beta=0.05$ , SE:0.02, $p<0.05$ ), but not for women aged 40 to 64 years, controlling for age, ethnicity, gender, self-reported health status, income, insurance, and oral reading fluency

Abbreviations: AA, African American; AHR, Adjusted hazard ratio; AOR, Adjusted odds ratio; API, Asian and Pacific Islander; ARR: Adjusted relative risk; CCLAT, Cervical Cancer Literacy Assessment Tool; CMLT, Cancer Message Literacy Test; FOBT, Fecal Occult Blood Test; HBM, Health Belief Model; HL, Health Literacy; HLHA, a framework of Health Literacy and Health Actions; MHLS, Mandarin Health Literacy Scale; MMSE, Mini-Mental State Examination; NAAL, National Assessment of Adult Literacy; NR, not reported; REALM, Rapid Estimate of Adult Literacy in Medicine; SILS, Single item literacy screener; s-TOFHLA, Short Test of Functional Health Literacy in Adults; TOFHLA-S, Test of Functional Health Literacy in Adults in Spanish; WA, White American

<sup>a</sup> Case management was included in the program as a usual care for women who in the NBCCEDP, National Breast and Cervical Cancer Early Detection Program.

<sup>b</sup> Competing priorities risk score: a sum of three binary indicators including working  $\geq 2$  jobs, need for rescheduling physician appointments, and family income  $< \$10,000/\text{year}$ ; health risk score: a sum of three binary indicators including having any chronic disease, smoking, and perceived poor or very poor health; system risk score: a sum of three binary indicators including having no health insurance, difficult access to healthcare, and low recent exposure to cervical cancer media.

<sup>c</sup> HL was measured on the item response theory theta scale, ranging from -3 to +3, which can be transformed to the 0 to 500 metric.

**Table 2.3** Reported Associations among Health Literacy, Psychosocial Variables, and Cervical Cancer Screening (N=12)

References pertaining to the associations among health literacy, psychosocial variables, and cervical cancer screening		
	1. Health literacy	2. Cervical cancer screening
1. Health literacy		
2. Cervical cancer screening	+: (Mazor et al., 2014) <sup>a</sup> (Roman et al., 2014) <sup>b</sup> (Lindau et al., 2006) <sup>a</sup> (Cho et al., 2008) (Garbers & Chiasson, 2004) (Scott et al., 2002) (White et al., 2008) ±: (Bynum et al., 2013) (Lee et al., 2012) -: (Garbers et al., 2010) 0: (Schapira et al., 2011) <sup>c</sup>	
3. Cervical cancer knowledge	+: (Lindau et al., 2002) ±: (Garbers & Chiasson, 2004) (Lee et al., 2012) (Schapira et al., 2011) 0: (Bynum et al., 2013)	+: (Schapira et al., 2011) ±: (Lee et al., 2012)
4. Perceived cancer worry	+: (Schapira et al., 2011) ±: (Lindau et al., 2002)	0: (Schapira et al., 2011)
5. Perceived barriers	0: (Schapira et al., 2011)	+: (Schapira et al., 2011)
6. Perceived benefits	0: (Schapira et al., 2011)	0: (Schapira et al., 2011)
7. Perceived susceptibility	0: (Schapira et al., 2011)	0: (Schapira et al., 2011)

+ Significant positive association; 0: no association; -: significant negative association;

±: significant association in unadjusted models

<sup>a</sup> Discrepancies were identified based on health literacy measures.

<sup>b</sup> HL risks score was a sum of three binary indicators including low Cervical Cancer Literacy Assessment Tool, not knowing a family cancer history, and < high school education completion.

<sup>c</sup> Receipt of a Pap test was measured as one of the preventive care practices (cancer screening).

## **CHAPTER THREE: MANUSCRIPT TWO**

Health literacy and cervical cancer screening among Korean American  
immigrant women: A correlational study

Target Journal: Patient Education and Counseling

## **Abstract**

**Introduction:** Although there has been a positive trend between health literacy and cancer screenings, mechanisms underlying the link between health literacy and cervical cancer screenings remain unclear. The aim of this correlational study is to examine the association between health literacy, theoretically selected psychosocial determinants, and Pap tests within the preceding three years.

**Methods:** Korean-American women 21–65 years of age ( $N=560$ ) were recruited for a randomized controlled trial to promote breast and cervical cancer screenings (2010–2011) in a northeastern metropolitan area and were interviewed regarding demographics, system factors such as physician recommendations, health literacy in cancer screenings, cervical cancer knowledge, decisional balance, cancer worry, self-efficacy, social support, and Pap tests. Guided by a health literacy-focused sociocognitive framework, data were analyzed using structural equation modeling in 2015.

**Results:** An acceptable fitting model revealed that health literacy was indirectly rather than directly associated with Pap test use through a psychosocial construct of a Pap test created by cervical cancer knowledge, decisional balance, and self-efficacy. Physician recommendations were directly and indirectly associated with Pap test use through health literacy and a psychosocial construct.

**Conclusions:** Theoretically driven psychosocial determinants such as cervical cancer knowledge, decisional balance, and cervical cancer self-efficacy were positioned as possible mechanisms through which health literacy had an impact on Pap tests. Cervical cancer screening interventions

targeted at Korean-American women are thus needed to address patient–physician communication and health literacy to affect identified psychosocial determinants and Pap test use.

## **Introduction**

The influx of immigrants—especially Asians and Hispanics—has transformed the United States (U.S.) into one of the most ethnically diverse countries in the world (Humes, Jones, & Ramirez, 2011). Indeed, the percentage of racial and ethnic minorities in the U.S. is expected to rise from 37% to 57% between 2010 and 2060 (U.S. Census Bureau, 2012). In the 2010 U.S. census, the Asian and Hispanic populations were the fastest-growing ethnic groups, due in large part to immigration, increasing by 43% compared to the 2000 census, and totaling more than 65 million (Humes et al., 2011). With this rapid increase, the number of limited English proficient (LEP) people in the U.S. is growing. For example, from 1980 to 2010, the LEP population grew by 158%, while the total population grew by only 38% (Ryan, 2013). Although Spanish-speaking populations—that constitute 62% of the LEP people in the U.S.—doubled in number between 1980 and 2010, subgroups of Asian immigrants are multiplying at an even faster rate (Ryan, 2013): the Korean-speaking population grew more than three-fold during the same time period. Given these demographic trends, more attention should be paid to the health concerns of the growing LEP populations.

Cervical cancer is the fourth most common cancer worldwide: More than half a million women are diagnosed with new cervical cancer cases each year and about 87% of deaths in developing countries are attributed to cervical cancer (Ferlay et al., 2015). Although developed countries have implemented effective early detection strategies over the last few decades, cervical cancer mortality rates remain high among certain groups of racial/minority women in the U.S., particularly recent Asian immigrants, due to late diagnosis (Arbyn, Raifu, Weiderpass, Bray, & Anttila, 2009; Vesco et al., 2011), which is most often associated with a lack of regular screening (McCracken et al., 2007; Miller, Chu, Hankey, & Ries, 2008; S. S. Wang, Carreon,

Gomez, & Devesa, 2010). Korean Americans (KAs) are the fifth-largest Asian subgroup and one of the largest LEP populations in the U.S.: ~60% of KAs have limited English proficiency (Ryan, 2013). KA women are twice as likely to develop cervical cancer and one-and-a-half times more likely to die from it compared to their non-Hispanic white counterparts (Miller et al., 2008; S. S. Wang et al., 2010). Notably, they have the lowest rate of receiving a Pap test within the preceding three years (only 63%-69% vs. 89% in non-Hispanic white women and 92% in non-Hispanic black women; McCracken et al., 2007; Nasser, Cress, & Leiserowitz, 2006).

Health literacy (HL) is defined as “the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions” (Ratzan & Parker, 2000). As the field is evolving, more recent definitions pay attention to the cognitive and social skill set needed for specific tasks to adequately navigate the U.S. healthcare system (Nutbeam, 2000; Speros, 2005). While nearly half of all American adults—90 million individuals—suffer from limited HL, recent LEP Asian immigrants are particularly affected by limited HL (68% of Chinese and 75% of Korean immigrants; Han, Kim, Kim, & Kim, 2011; Sentell & Braun, 2012). Ample evidence indicates that low HL is an independent predictor of limited health-related knowledge, self-efficacy, and inadequate health behaviors, including a lower probability of mammogram screening and influenza vaccination (Berkman, Sheridan, Donahue, Halpern, & Crotty, 2011). In this review, Berkman and colleagues argued that HL partially explains the disparities in health outcomes such as self-rated health status and preventive health behaviors (Berkman et al., 2011). This also highlights the potential role of HL—by improving the skill sets of recent immigrants to negotiate or navigate the U.S. healthcare system—as a means of overcoming health disparities such as cervical cancer.

Despite a growing body of research that has revealed the critical role of HL in the receipt of Pap tests among English- and Spanish-speaking women (Garbers & Chiasson, 2004; Scott, Gazmararian, Williams, & Baker, 2002; White, Chen, & Atchison, 2008), to the best of our knowledge, only one study has examined the direct association between HL and Pap test use among Asian women (S. Y. Lee, Tsai, Tsai, & Kuo, 2012). In the Lee study, HL was a significant correlate of health-knowledge and receipt of Pap tests among Taiwanese women; however, the study was conducted in Taiwan, where a national healthcare system is established and the majority of women use their national language, Mandarin. Furthermore, no theoretical framework was used to justify the selection of attributes of HL to understand the social context (S. Y. Lee et al., 2012). More systematic research is needed to establish a clear link between HL and receipt of Pap tests among LEP Asian immigrants in the U.S. and to test theory-based comprehensive and plausible pathways (both direct and indirect) related to HL and the target behavioral outcome.

The purpose of the present study was to comprehensively examine the relationships between HL and Pap test use within the preceding three years among KA women. von Wagner, Steptoe, Wolf, and Wardle (2009) proposed a framework of HL and health actions derived from social cognitive models (Ajzen, 1991; Janz & Becker, 1984). In this framework (von Wagner et al., 2009), HL affects health actions (e.g., access to and use of healthcare such as cancer screening) through psychosocial determinants such as motivational (e.g., knowledge, beliefs, attitudes) and volitional factors (self-efficacy, implementation skills). In addition to potential attributes of HL described in the framework, evidence supports that healthcare system factors such as insurance and a physician's recommendations influence KA women's Pap test use (e.g., Juon, Seung-Lee, & Klassen, 2003; H. Y. Lee, Roh, Vang, & Jin, 2011). In the framework, the



concept of accessibility of health information was operationalized as a physician's recommendation that affects psychosocial determinants. Based on the recent HL-focused, sociocognitive framework (von Wagner et al., 2009) and empirical evidence regarding KA women's Pap test use, we were particularly interested in investigating whether the following theoretically selected, culturally embedded psychosocial determinants of Pap test use mediate the association between HL and Pap test use: cervical cancer knowledge, decisional balance, self-efficacy, worry, and social support.

## **Methods**

### **Design**

This correlational study used a secondary analysis of baseline data obtained from a randomized controlled trial (hereafter referred as the parent study) that tested the effectiveness of a HL-focused intervention led by trained community health workers to promote breast and cervical cancer screening behaviors among KA women residing in the Baltimore-Washington Metropolitan Area (see "Schuster et al., 2015" for more details about the study).

### **Subjects and setting**

The following categories of KA women were eligible to participate in the parent study: 21–65 years of age, able to read and write either English or Korean, overdue for a breast or cervical cancer screening in the prior two years, and willing to provide written study consent and written consent to allow researchers to audit medical records for mammogram and Pap test use. Primary recruitment sites were Korean ethnic churches in the Baltimore-Washington Metropolitan Area—the third-largest metropolitan area in the U.S. and home to one of its largest KA populations (Zong & Batalova, 2014). Trained community health workers from the Korean churches in the target area recruited these women. A total of 560 eligible KA women completed

a paper-pencil study survey at baseline. Follow-up data were collected at 3 and 6 months. Baseline data were used for this study.

### **Sample size calculation**

There is no agreement in literature in regard to what is the required sample size for structural equation modeling (SEM). Usually, a sample of 100–200 is considered the minimum sample size adequate enough to run SEM (Boomsma, 1982). Available literature (Bentler & Chou, 1987) reported that sample size could be estimated in consideration of the ratio of cases to the number of free parameters, with a suggested ratio of 5-10 cases per each parameter. In this study, we had 36 free parameters; thus, the minimum appropriate sample size would be 180-360. We had 560 participants in our sample, which met the minimum required sample of 180-360.

### **Procedures**

The Institutional Review Board approved all study procedures. Following identification of potential participants by trained community health workers, trained bilingual research staff reached out to these women, provided a brief explanation about the study, and verified the eligibility of the women. The research staff then obtained a written informed consent from eligible women who agreed to participate in the study, and administered the study questionnaire. Procedures to assess HL among KA women were reported elsewhere (Han, Huh, Kim, Kim, & Nguyen, 2014). In brief, print literacy was measured using a paper-pencil questionnaire. While all instructions were written in Korean, all items on the HL scale were written in English (Han et al., 2014). This is because the previous validation study reported that the Korean-translated version of the Rapid Estimate Adult Literacy in Medicine (REALM) and the Test of Functional Health Literacy in Adult did not effectively capture the concept of health literacy in KA women whose primary language is a phonetic language (i.e., an individual can pronounce a word as long

as they can recognize the alphabets; (Han et al., 2011). This violates logic behind the development of popular literacy tests such as the REALM, which supposes a high correlation between decoding skills and comprehension (Han et al., 2011). A laminated list of cancer-specific words and a nutrition label were also given to assess reading ability and numeracy testing, respectively. Each participant received \$20 for her time.

## **Measures**

The following sample characteristics were measured using a study questionnaire: age, education, income, English proficiency, length-of-stay (in years) in the U.S., insurance status, and a physician's recommendation about Pap test use within one to two years. Education was assessed by asking a participant about total years of education. Income was measured by assessing their income comfortability measured on a 5-point Likert scale (1=very stable to 5=very unstable). English proficiency was measured by asking about self-reported spoken English proficiency on a 4-point Likert scale (1=not at all to 4=fluent). The length-of-stay (in years) in the U.S. was assessed by asking a participant about years lived in the U.S., which was transformed into a proportion-reflecting residency in the U.S. The primary outcome—KA women's Pap test use within the preceding three years—was measured by asking a participant to recall the month and year of her most recent Pap test. Whether each participant had received a Pap test within the preceding three years was assessed by deducting from the date of the baseline data collected to her latest receipt of a Pap test. The following section describes the instruments used to measure key study variables.

### *Assessment of Health Literacy in Cancer Screening (AHL-C)*

The AHL-C was used to measure an individual's HL (Han et al., 2014), which is a cancer screening-specific HL instrument developed on the basis of the Baker (2006)'s conceptualization

of HL (Baker, 2006). Baker conceptualized HL as a subset of prior knowledge (i.e., “an individual’s knowledge at the time before reading health-related materials or speaking to a health care professional”) and reading fluency (i.e., “the ability to mentally process written materials and form new knowledge”). Following the conceptual definitions of HL [26], the AHL-C consists of 52 items representing five subscales: reading ability (12 items), navigational literacy (12 items) and numeracy (4 items) for reading fluency, and comprehension (12 items) and familiarity (12 items) for prior knowledge (Han et al., 2014). The AHL-C validation study (Han et al., 2014) reported acceptable to excellent internal consistency reliability coefficients, ranging from 0.70 to 0.92 among recent immigrant KA women. In the study (Han et al., 2014), the construct validity of the AHL-C scale was assessed by testing correlation with known variables such as age and education (Pearson’s correlation coefficients [ $r$ ]=0.11 to 0.62). The scale also had strong concurrent validity ( $r=0.87$ ) with the Rapid Estimate Adult Literacy in Medicine. Participant responses were coded as correct or incorrect, with total possible scores ranging from 0 to 52.

#### *Cervical Cancer Knowledge (CCK) Test*

Cervical cancer knowledge was assessed using a CCK test that focused on cervical cancer knowledge. Given the recent development in our understanding of the relationship between HPV and cervical cancer, 10 items were added to the CCK, resulting in a 20-item test (Allen et al., 2009; Park, Chang, & Chung, 2005). The modified scale yielded an internal consistency reliability (Kuder–Richardson) of 0.85 in the study sample.

#### *Cervical Cancer Self-Efficacy Scale (CCSE)*

The Korean-translated CCSE scale was used to measure how confident a woman was in carrying out each task in relation to a Pap test. The CCSE scale consists of four items on a 4-

point Likert scale (Fernandez et al., 2009; Hogenmiller et al., 2007). Previous studies reported very high reliability, with Cronbach's alpha of 0.95 and acceptable discriminant and convergent validity of CCSE in Latinas (Fernandez et al., 2009). The reliability of the Korean version of CCSE had an internal consistency reliability coefficient of 0.92 in the study sample.

#### *Decisional Balance for Pap Test*

Decisional balance was assessed by asking participants about the perceived pros and cons of a Pap test (Rakowski et al., 1997). This scale consists of five pros (e.g., “A Pap test finds cancer at a point when it is more likely to be cured.”) and nine cons (e.g., “I worry that if I have a Pap test, I will need an operation.”) of Pap test use measured on a 5-point Likert scale (1=strongly disagree to 5=strongly agree). The nine cons items were reverse-coded. The reliability of decisional balance measure among Asian Americans (i.e., Chinese) is satisfactory, with Cronbach's alphas ranging from 0.76 to 0.86 (Strong & Liang, 2009). The Korean version of the measure had a Cronbach's alpha of 0.84 in this sample.

#### *Personal Resource Questionnaire (PRQ) 85-Part 2*

PRQ 85-Part 2 was used to assess each participant's perceived social support from friends and family, rating functional content of the relationship (e.g., feeling loved or supported and having a confidant) (Weinert & Brandt, 1987). This PRQ 85-Part 2 consisted of 25-items on a 7-point Likert scale (1=strongly disagree to 7=strongly agree), and higher scores ranging from 25 to 175 represent higher levels of perceived social support (Han, Kim, & Weinert, 2002; Weinert & Brandt, 1987). The construct validity of the translated version of PRQ 85-Part 2 was acceptable in the Korean sample (Han et al., 2002). The reliability of this instrument was high, with a Cronbach's alpha of 0.93 among KAs (Han, Kim, Lee, Pistulka, & Kim, 2007) and 0.94 in the study sample.

### *Worry about Cervical Cancer Examination*

The Worry about Cervical Cancer Examination scale was used to measure the participant's worry following abnormal Pap test results. The scale was adopted from the Short Form of the Fear of Progression Questionnaire (FoP-Q-SF) (Mehnert, Berg, Henrich, & Herschbach, 2009). This Korean-translated version of the worry scale consisted of 10 items on a 5-point Likert scale (1=do not worry at all to 5=worry about a lot that I do not want to have any test) and had excellent reliability of Cronbach's alpha 0.93 in this Korean sample.

### **Statistical analysis**

#### *Sample characteristics*

Descriptive statistics were performed using Stata 13. Descriptive statistics were used to summarize a mean and standard deviation for continuous variables and tabulate a frequency and percentage for categorical variables. Sociodemographic variables were categorized as follows: Age: (1) younger than 40 years and (2) equal to or older than 40 years; education: (1) up to graduation from high school and (2) at least college education; English proficiency: (1) not at all, poor, fair and 2) fluent; Length-of-stay in the U.S. was transformed into a proportion-reflecting residency in the U.S. (in years): (1) women who had spent more than 25% of their lifetime in the U.S. and (2) those who had not. A healthcare system variable such as health insurance was categorized in two groups: (1) uninsured and (2) private, Medicare and Medicaid, or other, such as traveler's insurance and student insurance.

#### *Potential pathways that link between health literacy and Pap test use*

Based on the theoretical framework used for the study, we used SEM analysis and examined potential mediators of the association between HL and Pap test use within the

preceding three years. SEM allows modeling latent variables by synthesizing multiple indicators for each construct such as HL, distinguishing direct, indirect, and total effects of the associations, adjusting for measurement errors in endogenous variables, and simultaneously investigating all hypothesized relationships (Bollen, 1989). SEM fitting and testing was performed using Mplus version 7 via maximum likelihood estimation with robust standard errors and at a significance level (alpha) of 0.05 (Muthén, L.K. and Muthén, B.O., 2012). Because the final dependent variable (Pap test use) was dichotomous, bootstrapping (5000 samples) was used to obtain standard errors and confidence intervals, which helped to determine the significance for the mediation pathways (Hayes, 2009). In particular, the bias-corrected bootstrapping method was used to deal with the potential non-normal distribution of the indirect effect; if 95% asymmetric confidential intervals of the estimates did not include zero, the path was considered significant (Mackinnon, Lockwood, & Williams, 2004). Using a weighted least squares means and variance adjusted (WLSMV) estimation, we estimated standardized path coefficients and model fit indices. The comparative fit index (CFI) >0.90, the root mean square error of approximation (RMSEA) <0.10, and the Tucker-Lewis index (TLI) >0.90 were indicative of an acceptable-fitting model (Bentler & Bonett, 1980; Browne & Cudeck, 1993; Hu & Bentler, 1999). Because another goodness-of-fit index, chi-square statistics (>0.05), is considered inappropriate to evaluate model fit when the sample size is large (Yu, 2002), a relative chi-square test ( $\chi^2/\text{df}$ ) was used with an acceptable ratio ranging from 2.0 (Tabachnick, 2007) to 5.0 (Wheaton, Muthén, Alwin, & Summers, 1977). We developed two models: Model 1 (a full model) examined the coexistence of a direct effect of HL on Pap tests and an indirect effect of HL on Pap tests through a mediator; Model 2 (a nested model) only tested the indirect effect of the relationship through a mediator. The final model was determined (Model 1 vs. Model 2) based on chi-square difference testing to

compare a nested model relative to a comparison model using log-likelihood values. If a statistically significant p-value is produced, it indicates that the nested model worsens the model fit; thus, we would choose the full model.

## **Results**

### **Sample characteristics**

Sociodemographic and healthcare system variables of the sample are presented in Table 3.1. All women were born in Korea. A majority of women were middle-aged (mean age  $\pm$  SD:  $46.1 \pm 8.5$  years, range: 21 to 65 years), and had at least some college education (64.8%, mean year of education  $\pm$  SD:  $14.5 \pm 2.7$  years). About 70% of the sample had stayed in the U.S. for 10 years or more (mean length of stay in the U.S.  $\pm$  SD =  $16.5 \pm 9.7$ ), ranging from 1 month to 62.3 years. About 59% stayed in the U.S. for one-fourth of their lives. Less than one third (26.4%) of the sample felt very comfortable, comfortable, or neutral regarding their household income level, and about four out of five reported their English as being not at all, poor, or fair. Only 23.4% reported that they spoke English fluently. Only 37.9% stated having health insurance. Only 15.7% reported receiving a physician's recommendation regarding a Pap test within the preceding one or two years.

[Insert Table 3.1 here]

### **Measurement model**

The measurement model for psychosocial construct of Pap test was modified by deleting worry related to cervical cancer examination and social support due to a poor fit. The modified measurement model for the psychosocial construct of a Pap test comprised cervical cancer knowledge, perceived pros and cons of a Pap test (decisional balance), and cervical cancer self-



efficacy. The combined measurement model, including HL construct (i.e., comprehension, familiarity, print literacy, and numeracy) and the psychosocial construct of a Pap test (i.e., cervical cancer knowledge, decisional balance, cervical cancer self-efficacy), showed acceptable model fit (CFI=0.923, RMSEA=0.092 [90%CI: 0.076 to 0.109], TLI=0.887, and a relative chi-square test=108/19).

## **Structural model**

### *Testing the relationships among health literacy, mediator, and Pap test use*

The hypothesized associations were assessed in Model 1 that tested both direct and indirect effects of HL on Pap tests, including covariates of HL—age, education, English proficiency, length-of-stay in the U.S., health insurance status, and a physician’s recommendation—and Pap test use within the preceding three years. Fitting data to the model generated a generally acceptable but mediocre fit (CFI=0.876, RMSEA=0.058 [90% CI: 0.049 to 0.068], TLI=0.843, and a relative chi-square test=206.783/71). Thus, after carefully reviewing the parameters, we made the following two modifications to the model without substantive changes of the structure: We deleted the length-of-stay in the U.S. due to small contribution to the model compared to other covariates of HL and worsening model fit (a chi-square difference testing unavailable). In addition, we added a path that links between a doctor’s recommendation and a psychosocial construct that is hypothesized in von Wagner et al. (2009). The association has been based on a role of effective patient-physician communication in affecting a patient’s psychosocial factors such as cancer-specific knowledge within the context of breast and colorectal cancer screenings (Fox et al., 2009). Adding the path increased model fit (a chi-square difference testing,  $p=0.0006$ ).

After modifying the structure, we fit data to the revised Model 1 that tested both direct

and indirect effects of HL on Pap tests (see Figure 3.1). This model yielded the goodness-of-fit indices: CFI=0.903, RMSEA=0.057, 90%CI (0.048, 0.067), TLI=0.874, and a relative chi-square testing=176/62. Although all other pathways were significant ( $p<0.05$ ), the direct pathway between HL and Pap test use was no longer significant ( $p=0.215$ ). About 37.6% of the total variance in the dependent variable—receiving a Pap test—was explained by HL indicators (comprehension, familiarity, print literacy, and numeracy) and psychosocial construct indicators (cervical cancer knowledge, decisional balance, cervical cancer self-efficacy) in the model (not including covariates).

[Insert Figure 3.1 here]

In Model 2 we removed the direct pathway between HL and Pap test use and tested an indirect relationship between HL and Pap test use through selected mediators. Path coefficients are given in Figure 3.2. The total variance explained in the final dependent variable, Pap test use, was slightly reduced (33.9%); however, this model resulted in a similar goodness-of-fit with the data: CFI=0.904, RMSEA=0.057, 90%CI (0.047, 0.067), TLI=0.876, and a relative chi-square test=176/63. Using log-likelihood values from Model 1 and Model 2, a chi-square difference testing was performed. Model 2, which had only an indirect pathway of the above relationship (i.e., a parsimonious model), was retained (chi-square=1.548,  $df=1$ ,  $p=0.2135$ ).

[Insert Figure 3.2 here]

## **Discussion**

To the best of our knowledge, this is one of the first studies to systematically investigate potential pathways between HL in cancer screening and Pap test use among a high-risk group of Asian immigrant women using a validated cancer-specific comprehensive HL measure. Our study revealed that the levels of HL were indirectly rather than directly associated with Pap test

use; the relationship between HL and Pap test use was mediated by cervical cancer knowledge, decisional balance, and self-efficacy among KA women.

This study underscores the critical yet indirect role of cancer-specific HL in adopting Pap test guidelines among underserved recent immigrant women who lack English proficiency. Though limited, available research yielded inconsistent findings regarding the association between HL and cervical cancer screening (Garbers & Chiasson, 2004; S. Y. Lee et al., 2012; Mazor et al., 2014; Roman et al., 2014). Our finding clearly shows a mechanism through which HL influences cervical cancer screening. A possible explanation about the result could be the use of a comprehensive HL assessment tool (i.e., AHL-C) to adequately assess the level of HL in the context of cancer screening. Previous studies used cancer literacy measurements that capture HL only partially (two domains of HL such as reading and listening literacy apart from numeracy (Mazor et al., 2014), or cancer knowledge instead of HL (Roman et al., 2014). A growing body of literature has focused on developing HL assessment tools within a particular context such as asthma, diabetes, high blood pressure, or genetics (Apter et al., 2006; Erby, Roter, Larson, & Cho, 2008; Huizinga et al., 2008; Kim et al., 2012); evidence supports that these tools effectively predict improved knowledge following education (Erby et al., 2008), better HbA1C (Cavanaugh et al., 2009), and improvements in quality of life and asthma control (Apter et al., 2006). Our findings underscore the importance of using a validated, reliable HL assessment tool such as the AHL-C to adequately capture the concept of HL in the context of cancer screening.

In this study, we tested a comprehensive HL-focused framework (von Wagner et al., 2009) using data collected from recent immigrant women. In particular, we used a latent variable model within SEM to measure HL with scores from multiple domains of HL (familiarity, comprehension, print literacy, and numeracy) and a culturally embedded mediator from

theoretically selected domains of a psychosocial construct of Pap tests (cervical cancer knowledge, decisional balance, and self-efficacy); this improved the construct estimation and control for measurement errors (Bollen, 1989). Our SEM analysis supported the existing theoretical framework on the indirect effect of HL on utilization of preventive practices such as Pap test use through psychosocial determinants (von Wagner et al., 2009). This study adds empirical evidence regarding the indirect effect of HL on Pap test use to the HL theoretical framework. A research team has recently developed and implemented an intervention program to improve HL as a means of promoting Pap test use among KA women (Schuster et al., 2015). Further analyses should be carried out to guide future research on the development and modification of a HL-focused intervention to mitigate non-compliance with national screening guidelines among a high-risk group of women. As an example, understanding how psychosocial mediators (e.g., cervical cancer knowledge, decisional balance, and cervical cancer self-efficacy) interplay between each other and also affect KA women's Pap test use in relation to HL may help to design a tailored intervention.

Comparing two models with and without a direct pathway that links HL to Pap test use, the model with only an indirect pathway linking HL to Pap test use through a latent mediator was retained. In our study, having greater HL contributed to having greater cervical cancer knowledge, greater perceived benefits of and fewer perceived barriers to Pap test use (decisional balance), and a higher degree of self-efficacy regarding Pap tests. These intermittent psychosocial factors then affected the receipt of Pap tests. The results suggest that improving KA women's HL is a first step towards improving Pap test use. In the context of cervical cancer control, knowledge was the only mediator tested (S. Y. Lee et al., 2012); in the international study, however, HL did not affect Pap tests indirectly through knowledge. It should be noted that

in the study (S. Y. Lee et al., 2012), the potential mediator variable (general health knowledge) was not measured in the context of cervical cancer control. To a large extent, our findings are congruent with studies that support an indirect effect of HL on health behaviors such as diabetic self-care (Brega et al., 2012; Leung, Cheung, & Chi, 2014; Osborn, Bains, & Egede, 2010) and asthma self-care (K. Y. Wang et al., 2014), which was guided by recent HL-focused theoretical frameworks (Paasche-Orlow & Wolf, 2007; von Wagner et al., 2009). In particular, diabetes-related knowledge had an indirect impact on the association between HL and diabetes self-care (Brega et al., 2012; Leung et al., 2014; Osborn et al., 2010). Other psychosocial factors such as perceived capacity to communicate with their providers, diabetes fatalism, and social support were also noted as mediators (Leung et al., 2014; Osborn et al., 2010). Nonetheless, although the aforementioned psychosocial factors such as fatalism were considered to influence self-care in chronic diseases in relation to HL, only a few studies have examined the role of cancer-specific psychosocial factors such as cancer fatalism in relation to HL in the context of colorectal cancer control (Miles, Rainbow, & von Wagner, 2011). Hence, further investigation is warranted to examine the role of cancer-specific psychosocial factors in receiving a Pap test in relation to HL.

We confirmed that system factors such as a doctor's recommendation ( $p < 0.001$ ) play a significant role in Pap test receipt among KA women. Our finding is consistent with that of studies that highlighted the doctor's recommendation in predicting Pap test use among KA women (e.g., Juon et al., 2003; H. Y. Lee et al., 2011). On the other hand, more than one in four Korean women in the study sample did not receive a Pap test, despite a doctor's recommendation. This calls for investigations into how the process of patient-physician communication affects Pap test use. In the current analysis, HL mediated the association between a doctor's recommendation and a KA woman's psychosocial construct of a Pap test, which in turn led to an

increased rate of Pap test use. In a review on HL and cancer communication, Davis, Williams, Marin, Parker, and Glass (2002) suggested that patients with limited HL have particular difficulties in understanding the importance of cancer screening and, consequently, experience a late diagnosis of cancer. Effective communication skill training for clinicians can increase women' levels of HL and change critical psychosocial factors of Pap test use in positive ways, thereby increasing Pap test use among a high-risk group of women such as KA women.

This study has several limitations. First, given the nature of cross-sectional data, the mediating effects must be interpreted with caution; we may not be able to say that KA women's HL leads to their receipt of a Pap test, nor do potential mediating determinants occur in the causal pathway between HL and receipt of a Pap test. Second, the outcome variable, a KA woman's Pap test use, was assessed by self-reporting at baseline. Pap test rates might have been over- or underestimated. Studies have demonstrated 70% to 87% of agreement rates between self-reports and receipt of Pap tests, as verified by medical record review (Caplan et al., 2003; McGovern, Lurie, Margolis, & Slater, 1998). We attempted to minimize recall bias by asking specific information (i.e., cues to remember) such as the place that they received the last Pap test, in addition to the year of the test. Third, participants were recruited from ethnic churches. Epidemiological research indicates that at least 85% of KAs attend ethnic churches weekly (Kim, Juon, Hill, Post, & Kim, 2001), making churches an ideal research site for the target population. Similarly, the study sample was drawn from churches on the east coast. As a result, generalizability of the study findings is limited. Lastly, due to a limitation in statistical computation with Mplus, the conventional model fit indices were not generated when structural equation modeling was performed with maximum likelihood estimation with robust standard errors. To estimate the conventional fit indices and standardized path coefficients regarding the

model, we employed a WLSMV approach in addition to the maximum likelihood estimation (Arlinghaus, Lombardi, Willetts, Folkard, & Christiani, 2012; Johnson, Whisman, Corley, Hewitt, & Rhee, 2012).

### **Conclusions**

Health literacy played an essential yet indirect role in Pap test use among KA women. Particularly, we found possible mechanisms through which HL influenced KA women's Pap test use. Traditional intervention programs have focused mainly on improving cancer knowledge and addressing barriers with short-lived effects. Future interventions should consider psychosocial and cultural factors and skill-based approaches such as HL training as potentially sustainable ways of promoting Pap test use and ultimately reducing cervical cancer disparities in high-risk groups of women. Such research is crucial for the development of evidence-based, tailored interventions to promote cervical cancer screening among underserved women.

### **Practice Implications**

Non-compliance with cervical cancer screening guidelines yields notable disparities in the rates of cervical cancer incidence and mortality in underserved racial/ethnic minorities in the U.S. Our findings call for greater attention to effective patient-provider communication strategies to address cancer knowledge (e.g., risk factors, recommended guidelines), KA women's perceived benefits and barriers to cancer screening, and confidence in their ability to receive cancer screening by increasing HL. Hence, medically underserved immigrant women can build skill sets to understand and process relevant information and make an appropriate decision regarding Pap test use.

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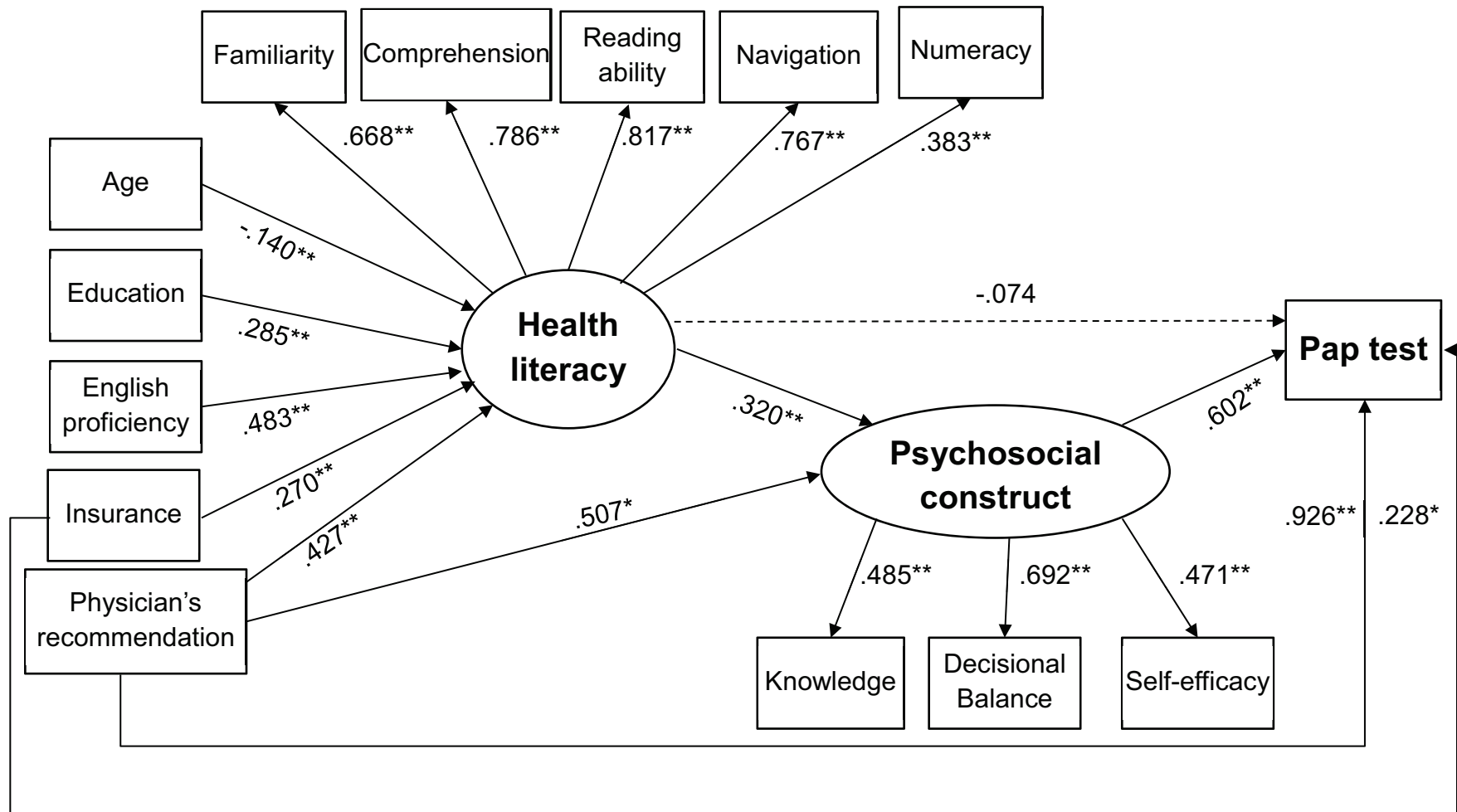
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**Table 3.1** Sample Characteristics of Secondary Analysis (N=560)

Variables	n(%)	Mean±SD
Age, years (range=21-65)		46.1±8.5
20-30s	137 (24.5)	
40s+	423 (75.5)	
Marital status		
Married/partnered	480 (85.7)	
Separated/widowed/divorced/never married	80 (14.3)	
Years of education (range=4-24)		14.5±2.7
High school graduate or less	197 (35.2)	
Some college+	363 (64.8)	
Years in the United States (range=0.1-62.3)		16.5±9.7
<25% of their life	230 (41.1)	
25%+ of their life	330 (58.9)	
Income level		
Very comfortable/comfortable	148 (26.4)	
Neutral/uncomfortable/very uncomfortable	412 (73.6)	
Have health insurance	212 (37.9)	
English proficiency (range=1-4)		2.7±0.9
Not at all/poor/fair	429 (76.6)	
Fluent	131 (23.4)	
Have primary care physician	193 (34.5)	
Receive a physician's recommendation	88 (15.7)	

**Figure 3.1** Testing direct and indirect pathways between health literacy and Pap test use



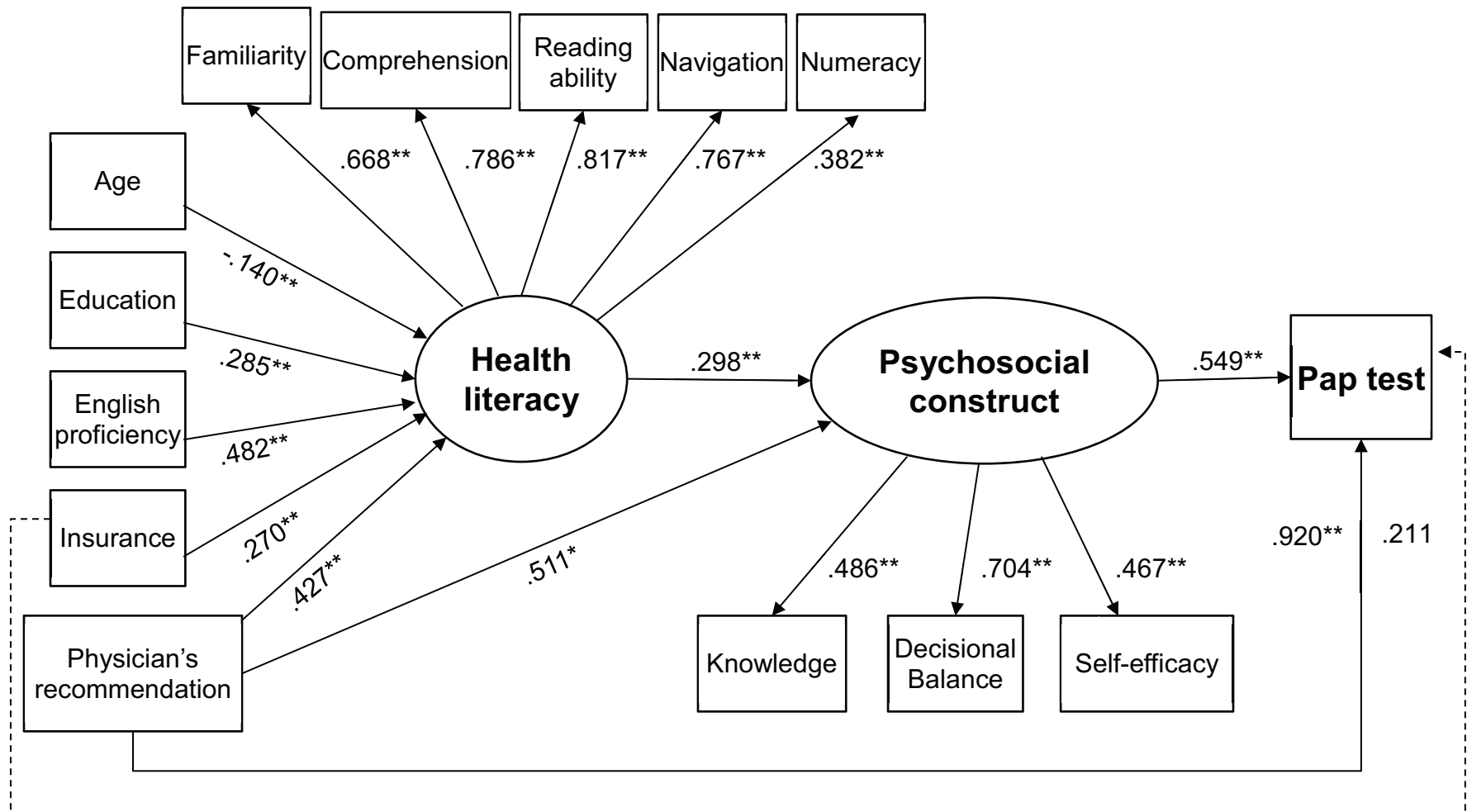
Structural equation modeling was performed with weighted least squares means and variance adjusted approach to get standardized path coefficients.

\* $p < 0.05$ , \*\* $p < 0.001$

— : Significant path

----- : Non-significant path

**Figure 3.2** Testing an indirect pathway between health literacy and Pap test use



Structural equation modeling was performed with weighted least squares means and variance adjusted approach to get standardized path coefficients.

\* $p < 0.05$ , \*\* $p < 0.001$

— : Significant path

- - - : Non-significant path

## **CHAPTER FOUR: MANUSCRIPT THREE**

Decision making about cervical cancer screening among Korean American  
women: A qualitative study

Target Journal: Medical Decision Making

## **Abstract**

**Introduction.** Shared decision making in cancer screening has emerged as one of the ideal models for patient-physician collaboration and interaction. Despite progress in controlling cervical cancer in the U.S., Korean American women experience a substantial burden of cervical cancer due in part to their consistently lower rates of getting Pap tests compared to other ethnic groups. Understanding how Korean American women make a decision about Pap tests may help better understand their low uptake of Pap tests. The aim of this study was to explore decision making about Pap test use among Korean American women.

**Methods.** We conducted 30 semi-structured in-depth individual interviews with Korean American women residing in a northeastern metropolitan area. The data were audio-recorded, transcribed verbatim, and analyzed using an open, inductive coding.

**Results.** Three main categories emerged: decision types, barriers and facilitators in regard to decision about a Pap test, and decision reflection. Types of decision making about a Pap test varied (hierarchical, autonomous, collaborative, peer-influenced). In the process of reflecting on their decision, most women felt glad that they got a Pap test done and would make the same decision again, though some women with negative results felt ambivalent about their decision (to receive a Pap test) due to mental distress associated with Pap tests. Some women chose to just live with their decision not to receive a Pap test.

**Discussion.** Understanding decision types and factors influencing decision about a Pap test is the first step toward developing a patient-centered approach to improving

compliance with cervical cancer screening guidelines. Future research is warranted to facilitate Korean American women's desired role in shared decision making.



## **Introduction**

Over the last few decades, there has been considerable discussion about patient engagement in decision making (Almyroudi, Degner, Paika, Pavlidis, & Hyphantis, 2011). The degree to which a patient participates in decision making ranges from active participation in which the patient is empowered to make his/her own decisions about his/her health to passive participation in which the physician decides what is best for the patient (Emanuel & Emanuel, 1992). Recently, there has been emphasis on shared decision making as a model of patient-physician collaboration in health behaviors and outcomes in which more than one possible option exist, such as prostate and colorectal cancer screening (Almyroudi et al., 2011; Barry & Edgman-Levitan, 2012; Charles, Gafni, & Whelan, 1997).

Previous studies of shared decision making in breast, colorectal, and prostate cancer screenings revealed that discussions with healthcare providers about cancer screening are often limited, particularly about the drawbacks of testing, or that healthcare providers tend not to invite patients to engage in decision making (Fairfield et al., 2015; Hoffman et al., 2014). Hoffman et al. (2014) found that while 68% to 85% of providers expressed their opinions about the screening (recommendation), most participants (45% to 69%) considered them to be a final decision maker, or they made a decision with their provider (27% to 38%); only a few patients relied on healthcare providers' opinion alone. Yet, these studies showed that healthcare providers usually failed to provide a balanced discussion about screening and patients' preferences (Fairfield et al., 2015; Hoffman et al., 2014). This failing might have reduced the quality of cancer screening decision and precluded patients from making an autonomous decision.

Cervical cancer remains a significant health concern for women worldwide, accounting for nearly 7.5% of all cancer-related deaths (Ferlay et al., 2015). Yet, there has been little discussion of decision making in the context of cervical cancer screening (Dieng, Trevena, Turner, Wadolowski, & McCaffery, 2013). Compared to other screenings such as prostate cancer for which a screening recommendation is controversial, the benefits of regular cervical cancer screening (i.e., Pap test) are well known. Nevertheless, several updates on screening methods and intervals for cervical cancer over the last few decades may create confusion (American Cancer Society, 2012; U.S. Preventive Services Task Force, 2012). In addition, previous studies revealed that a decision to get a Pap test may be affected by women's cultural beliefs about the test and about gynecological exams in general, particularly for women from diverse racial/ethnic groups (Johnson, Mues, Mayne, & Kiblawi, 2008). Thus, this finding calls for more attention to be paid to an understanding of decision making about a Pap test among women from culturally diverse backgrounds, such as Korean Americans (KA).

KA—the fifth-largest Asian subgroup in the U.S. (Ryan, 2013)—women experience nearly double the incidence and a one-and-a-half times higher mortality rate of cervical cancer than do non-Hispanic whites (McCracken et al., 2007; Miller, Chu, Hankey, & Ries, 2008; Wang, Carreon, Gomez, & Devesa, 2010). They also have the poorest compliance with national cervical cancer screening guidelines among women from diverse racial/ethnic groups in the U.S.: 63% to 68% of KA women have received a Pap test within the preceding three years, compared to 89% of non-Hispanic whites and 92% of African American women (McCracken et al., 2007; Nasser, Cress, & Leiserowitz, 2006). Previous studies have examined the correlates of KA women's Pap

test use, including sociodemographic (e.g., longer duration in the U.S., better English proficiency, having health insurance, and receiving a physician's recommendation) and psychosocial (e.g., better knowledge of cervical cancer, greater self-efficacy, lower perceived barriers to a Pap test) factors (e.g., Fang, Ma, Tan, & Chi, 2007; Juon, Seung-Lee, & Klassen, 2003; Lee, Fogg, & Menon, 2008; Ma et al., 2009). None of these studies, however, explored KA women's role in the decision making process, what prohibits and facilitates their decision to undergo a Pap test, or how these women reflect on their decision. This qualitative study was thus designed to explore KA women's decision making about a Pap test.

## **Methods**

### **Study Design**

This qualitative study used semi-structured, individual in-depth interviews with KA women to explore their decision making about a Pap test using open, inductive coding.

We conducted 30 semi-structured in-depth individual interviews with KA women residing in the Baltimore–Washington Metropolitan Area between December 2013 and December 2014. The individual interview facilitates in-depth exploration of an individuals' perspectives on health behaviors such as cervical cancer screening to construct meanings, and is useful particularly when the topic is sensitive (Charmaz, 2006; Denzin & Lincoln, 2000).

## **Setting and Sample**

KA women 21 to 65 years of age who were able to read and write in English or Korean and expressed a willingness to provide written consent to participate in the study were eligible. This age range was determined based on the national cervical cancer screening practice guidelines (U.S. Preventive Services Task Force, 2012). The exclusion criteria for the interviews were as follow: (1) women who had participated in the intervention group of an intervention study to promote cervical cancer screening in the preceding three years, (2) women who had been diagnosed with cervical cancer, and (3) women who had undergone a hysterectomy.

Participants were recruited from a northeastern metropolitan area (Central Maryland and Northern Virginia). The study team recruited potential participants using several sources: a pool of KA women in the control group from a community-based randomized controlled trial to promote breast and cervical cancer screenings among KA women (Schuster et al., 2015), faith-based organizations, an outpatient OB/GYN clinic, and by word-of-mouth. Using a standardized phone script, the principal investigator called potential participants who were in the control group of the community-based trial and agreed to be contacted for future study. The study team also distributed flyers explaining the study's purpose, eligibility, and procedures and provided a contact number. Potential study participants could also contact the study team directly to ask questions regarding the study.

## **Sampling**

The recruitment of interview participants was an iterative process in conjunction with reflections on the interviews. We considered participants' characteristics such as age,

educational level, years of residency in the U.S., health insurance status, and physician's recommendations to create a diverse interview sample. The sample was purposefully diversified to capture similarities and variations regarding KA women's views on experiences with Pap test use and perspectives on decision making about Pap tests (Patton, 2002). Recruiting the sample for interviews ended when informational redundancy appeared to be achieved (Sandelowski, 1995). We expected information redundancy to be reached after interviewing 20 to 32 participants based on a previous similar study using in-depth interviews to explore KA women's perceptions of cervical cancer (Lee, Tripp-Reimer, Miller, Sadler, & Lee, 2007).

### **Interview Participants**

Participant characteristics (N=30) were described with descriptive statistics using Stata 13 and are summarized in Table 4.1. Approximately 73% of the participants were married and middle aged (mean [SD]=48.6[11.8] years). More than half of the participants had some college education and more than 10 years of residency in the U.S. (mean [SD]=14.3[2.5]), yet had difficulty with English (67%). Eight participants (27%) lacked health insurance at the time of the study and only 23% reported receiving a physician's recommendation to obtain a Pap test within the preceding one or two years. Half of the women had received a Pap test within the preceding three years.

[Insert Table 4.1 here]

### **Interview Guide**

The interview guide (see Appendix A) was structured based on previous research on KA women's Pap test use, and the study team's experiences with the Korean

immigrant community. The interview guide was prepared with particular emphasis on the following: KA women's experience with and culture-specific perceptions of Pap test use, decision making about Pap tests including their roles in decision making, and confidence and satisfaction with the decisions (see Table 4.2). The interview guide was prepared in English, which was then translated into Korean by a bilingual research team. Following discussion among the team, the interview questions were modified to be clear to laypersons. The study team reviewed all alterations to the interview guide during the study period.

[Insert Table 4.2 here]

## **Procedures**

The study team obtained approval from the Institutional Review Board. After ensuring an understanding of the purpose and potential risks and benefits of the study as well as the voluntary participation of participants, the interviewer obtained informed consent. All individual interviews were conducted in Korean at a private place for the participants' convenience. Each interview lasted on average 1 hour (range 30 minutes to 2 hours) and each woman received \$30 for her time. During the interviews, the interviewer took field notes. The interviews were audio-recorded and transcribed verbatim.

## **Data Analysis**

The interviews were analyzed using QSR International's NVivo 10 qualitative data analysis software. The analysis drew on the following components of the grounded theory methodology (Charmaz, 2006): (1) simultaneous involvement in data collection

and reflection on interviews, (2) open, inductive coding, and (3) memo writing. Two bilingual coders read the interview transcripts and field notes several times to develop a general understanding of the interviews and highlight possible categories to explore; the two coders performed the coding process independently. Open, inductive coding was conducted to develop a comprehensive codebook using the first three interviews. Discrepancies between the two coders were resolved during team discussions, which is a strategy used to reach a deeper understanding of the data and incorporate diverse perspectives by facilitating discussions between the two coders. Subsequently, the codebook was applied to three interviews to determine whether it fit the data. The codebook was revised based on the identified discrepancies with the data. All interview transcripts were coded using the finalized codebook and field notes as well as memos, although newly emergent concepts were added to the finalized codebook and applied to the data. This strategy provided the researchers with a chance to incorporate emerging categories into the data throughout the simultaneous process, from interviews to coding (Charmaz, 2006). Emerging categories were discussed by the research team during regular meetings. Memos kept the coders involved in the analysis of the data and helped raise the level of abstraction of the primary coder.

### **Methodological Rigor**

Methodological rigor was accomplished using the following methods. First, all interviews were conducted and analyzed in Korean. To mitigate any methodological concerns related to repeated translation, the final results such as categories, subcategories, and subsequent quotes were translated from Korean to English by a professional translator. During the translation process, bilingual

researchers on the team conducted regular meetings to help incorporate the KA women's emic perspectives in relation to their decision making process about getting a Pap test. In addition, trustworthiness was attained (Lincoln & Guba, 1985) based on the following: (1) The study team's prolonged experiences and engagement with KA women ensured credibility; (2) the thick description of the results such as verbatim transcriptions and subsequent quotes maximized transferability, thereby enabling the audience to appraise the applicability of the findings beyond this study; and (3) independent coding by two bilingual researchers and the reconciliation of discrepancies among the research team ensured confirmability.

## **Results**

The following result section starts with the emerging categories and relevant subcategories related to KA women's decision-making process. Subsequent quotes were chosen to illustrate each category. Three main categories included: decision types, barriers and facilitators regarding decisions about a Pap test, and decision reflection. Types of decision making about a Pap test varied, including hierarchical, autonomous, collaborative, and peer-influenced types. Several barriers and facilitators of decision in regard to a Pap test affected their decision making. Depending on their decision about Pap test use, KA women's reflections on this decision varied: being glad to have it done or being ambivalent for those who have received a recent Pap test; being confident with the decision [not to get it]; or just living with the decision for those without a recent Pap test.



## **Types of KA Women's Decision Making about a Pap Test**

Upon being asked about their role in making the decision about a Pap test, almost all KA women in this study paused before expressing that they had never thought about this before and that they needed time to think. After the women were probed using the interview guide questions, they were able to articulate how they participated in making a Pap test decision. The types of decision making related to a Pap test among KA women in this study were autonomous, hierarchical, collaborative (doctor and spouse), and peer-influenced types. Example quotes are presented in Table 4.3.

### *Autonomous type*

Most KA women in this study claimed that, after searching for information from various sources, such as doctors, friends, and the public media, they made a Pap test decision themselves. One woman stated,

[Interviewer: *Who made the decision?*] Of course I did it. ... Yeah, I was in the center of it all. Of course, I got information from my friends and also the news media. When doctors gave me recommendations, I did not just follow them blindly. I did the research first. Through the research, I learned better about the test, understood why it is necessary, and convinced myself to take the examination. So I make my own decisions.

### *Hierarchical type*

Some women who had a regular healthcare resource and hence happened to receive a physician's recommendation indicated that they followed the decision

recommended by the authorities. Interestingly, this pattern was obvious for women who came to the clinic for noticeable health issues, such as bleeding between periods.

#### *Collaborative type*

In addition, some KA women stated that they made the decision about the Pap test in collaboration with their doctors or significant others after reviewing the relevant information. Disclosing information on cervical cancer and Pap test use to her husband and inviting her husband to assist in the decision about a Pap test was salient to younger KA women. For example, one young woman stated,

I usually talk to my husband about the test. “I think I may need to get a Pap test.” And my husband casually asks, “Isn’t it about time [to go]?” We talk [about the test]. There are these things that help me decide.

#### *Peer-influenced type*

Only a few KA women stated that their decision was based on peer influence. However, conversations regarding cervical cancer and the Pap test only occurred between very close friends.

[Insert Table 4.3 here]

### **Weighing Barriers and Facilitators of Pap Test Use**

#### ***Barriers to Decision about Pap Test Use***

KA women’s decisions to get a Pap test were influenced by a number of barriers and facilitators. The recurrent barriers to Pap test use were largely divided into individual

and system levels. Individual-level barriers included a lack of awareness/limited knowledge, perceptions and beliefs about Pap test and cervical cancer (e.g., feeling of shame, uterus is expendable, low susceptibility, and cancer fatalism), and repeated normal results. System-level barriers were difficulty finding culturally appropriate providers and a fragmented healthcare system. Relevant quotes supporting the category care are presented in Table 4.4.

*Lack of awareness/limited knowledge about cervical cancer and Pap tests*

Many women in this study were unaware of what the Pap test is. In fact, they were introduced to the Pap test for the first time, during the interviews. Even for those who received a regular Pap test, some did not know that the test they had received was a Pap test, nor had a clear understanding about the Pap test (who it is recommended for, the frequency one should obtain it, and pathology associated with cervical cancer). Also, most participants noted lack of discussion about their test results following a Pap test. For example, KA women stated that they wanted to have more dialogue with doctors regarding their Pap test results rather than receiving a letter, phone message, or no message at all about their results.

*Perceptions and beliefs about cervical cancer and Pap tests*

Various perceptions and beliefs about Pap tests and cervical cancer which influenced their decisions about a Pap test were shared by interview participants including feeling of shame, a belief that the uterus is expendable, low susceptibility, and cancer fatalism. In particular, the feeling of shame acted as a significant barrier to their Pap test use and negatively impacted their decision to obtain a Pap test.

A belief that the uterus is expendable was mentioned by a number of older women (with children) as a reason to decide not to get a Pap test. One woman stated, “I didn’t worry too much about my uterus. I thought I could just remove it if there is a problem. So I wasn’t so concerned.”

Most women also noted low susceptibility. They believe they were not a risk for cervical cancer because they had no visible or noticeable symptoms. Cancer fatalism was also mentioned by a number of women. Those who had relatives or close friends who suffered from cervical cancer believed that cancer is not something that people can avoid; hence no screening would prevent cancer. For example, one woman stated,

When she [her sister who has been diagnosed with breast cancer] showed up wearing a wig, I thought my heart stopped pounding. That’s how I feel now... I am so sad and just realized, “the screening and treatment... are all meaningless. That is cancer.”

#### *Repeating normal results*

Some women with a recent Pap test noted that they had considered not getting a Pap test because of normal Pap test results in the past. For example, one woman mentioned, “Everything was normal when I took the tests. I didn’t see why I should get a Pap test again when there wasn’t anything positive.”

#### *Difficulties in finding culturally appropriate providers*

KA women pointed out difficulty finding a culturally appropriate provider as a reason for not getting a Pap test. They wanted a renowned, Korean-speaking, female

doctor near their home who accepted their health insurance. Some women also wanted to have providers who listen to their concerns and kindly answer questions. The majority struggled to find a culturally appropriate healthcare provider in the community, which kept them from getting a Pap test. However, most women stated that they preferred to be seen by a non-Korean speaking male doctor when there was no non-Korean speaking female doctor in the community. They were afraid of encountering Korean male doctors in the Korean community or having friends or relatives who personally knew the male doctors.

#### *Fragmented healthcare system*

All women were immigrants from South Korea where universal healthcare coverage is offered. One of the biggest challenges at the system level that discouraged these women from getting a Pap test had to do with the fragmented healthcare system in the U.S. One woman stated, “When I go to the OB/GYN, they tell me to go somewhere else to receive a mammogram... Because the medical system here is all so fragmented, there are many inconvenient situations [such as having to make multiple visits to get a cancer screening done].”

[Insert Table 4.4 here]

#### ***Facilitators of Decision about Pap Test Use***

The recurrent facilitators were perceptions about cervical cancer and the Pap test (a belief that cervical cancer will be cured if detected early, fear about cervical cancer, mom should be healthy) and peer pressure. Relevant quotes are presented in Table 4.5.

#### *Perceptions about cervical cancer and the Pap test*

Most women who had been regularly receiving a Pap test mentioned the advantage of the test (i.e., early detection of cervical cancer). The women believed that cervical cancer could be cured if it was detected early enough. Also, some women stated that they might delay getting a Pap test due to their fear that they will be informed of having cervical cancer. However, most women who had received a Pap test stated that their fear associated with cervical cancer positively influenced their decision to get a Pap test. In the Korean culture, the mother is responsible for taking caring of the entire family, including the children. Therefore, a majority of KA women in this study thought that they should stay healthy in order to care for their families. For example, one woman stated, “I think it was more about being responsible. I’m a housewife and a mother so my health affects the happiness of my family. Therefore, I must be healthy.”

#### *Peer pressure to get a Pap test*

Some women stated that their friends who had received a Pap test regularly facilitated a decision to get a Pap test. One woman stated, “My friends take care of themselves a lot better than I do. They go to the hospital religiously, take all kinds of regular checkups and are very committed to their health. I think I should be like them.”

[Insert Table 4.5 here]

#### **Reflecting on the Decision Outcome**

The women’s reflections on the decision outcome differed by their Pap test status and included the following subcategories: being glad to have it done, becoming neutral, or being ambivalent for the women with a recent Pap test, or being confident with the

decision or just living with the decision for those without a recent Pap test. Relevant quotes are presented in Table 4.6.

### ***KA Women with a Recent Pap Test***

#### *I am glad I did and would make the same decision*

Most participants who underwent screening were glad that they got a Pap test and would make the same decision again. One woman who had a Pap test at the free community health clinic stated, “I was proud that I was able to go through the healthcare system to get the examination [in English]. I was glad that I got the test and felt very relieved. I would like to get tested once more.”

#### *Becoming neutral*

When reflecting on their decision some women indicated that they were initially worried and became anxious about their decision when getting a Pap test, but after several Pap tests they became neutral. The effect of “being neutral” on their future decisions appeared to vary. One woman who was aware of importance of a Pap test noted that her decision would not be changed and stated,

Every time I had an examination, the results turned out to be normal. Now I don’t feel as nervous as I did before. I just think I will be alright. I still get myself checked regularly, but I no longer worry that I might have a problem.

#### *Being ambivalent*

In contrast, others felt ambivalent about their decision due to continuing mental distress related to Pap tests (e.g., feeling of shame). This mostly occurred among women who got normal Pap test results. One woman stated,

I was like “OK, just get over it [Pap test] this time.” But if I were able to go back in time when I made the decision, I might not have gotten the test because I needed to show my private parts to the physician. ... But, I became to know the importance of a regular screening after the visit. ... Well... I have mixed feelings about the decision.

#### ***KA Women without a Recent Pap Test***

##### *Being confident with the decision*

A few women mentioned that they were confident with their decision to not get a Pap test: a few noted that their decision was fine because they did not have any noticeable symptoms, which made them think they had a low risk of developing cervical cancer.

##### *Just living with the decision*

Those who decided not to get a Pap test stated that they wished they could receive a regular Pap test. They said they were not satisfied, yet just lived with their decision. One woman stated,

I’d like to go [to get a screening], but there’s nothing I can do about it. My situation [that I can’t take time off from work] is not



quite favorable. So I just live with my decision [to not get a Pap test] believing that I will be alright.

### **Discussion**

To the best of our knowledge, this is one of the first qualitative studies to explore decision making about a Pap test. A purposive sample of KA women reported that most participants reported that they made a decision autonomously. A variety of barriers and facilitators of a Pap test affected KA women's decisions to take a Pap test. Women with a recent Pap test were usually confident with their decision and indicated that they would make the same decision, though some of them with negative Pap test results felt ambivalent about the Pap test use because of the associated mental distress (e.g., feeling of shame).

Charles et al. (1997) identified three prototypes of shared decision making in medical encounters: (1) a paternalistic model: the decision is made by doctors for dependent patients, (2) an informed model: the decision is made by patients after gathering information and reviewing alternative options, and (3) a shared decision making model: the decision is made collaboratively by doctors and patients after sharing available information. We found that all three decision patterns were noted, which is compatible with our previous study on cervical cancer prevention among KA women (K. Kim, Kim, Choi, Song, & Han, 2015). However, most women in this study appeared to be drawn to an informed model (autonomous type), although there was varying breadth and depth of seeking information and sharing the information with another significant decision maker. Similarly, Dieng et al. (2013) reported that most Australian women preferred to be actively involved in decision making regarding routine Pap tests (87%)

and that they would require information about the benefits and harms of a Pap test prior to the screening, while Greek breast cancer patients preferred a passive role in cancer treatment decision making (Almyroudi et al., 2011). It is noteworthy that healthy women appear to be favorable to taking control of their health by actively engaging in the decision making when options and consequence of their decision are relatively clear. Also, some KA women reported making decisions based on a paternalistic model (hierarchical type). This result might be associated with the fact that most of the women did not have regular healthcare sources and, hence, tended to make decisions about the Pap test prior to patient-provider encounters. Thus, providers should acknowledge various decision types in cervical cancer screening among KA women, thereby facilitating KA women's desired role in shared decision making.

We noted unmet needs of KA women in relation to cervical cancer screening practices. For example, a number of women who underwent screening did not know that the test they had received was a Pap test, and most participants reported they wanted to have more dialogue with their providers rather than receiving a letter or a message about their Pap test results. The findings indicate the KA women did not have adequate discussions about a Pap test before or after the procedures. This finding calls for better patient-provider communication about cervical cancer and Pap tests among KA women. Evidence suggests that enhanced patient-physician communication increases the likelihood of receiving certain types of cancer screening such as mammogram and Pap test among 605 predominantly white women aged 40 to 75 years (Politi, Clark, Rogers, McGarry, & Sciamanna, 2008) and fecal occult blood testing screening in a nationally representative sample of the U.S. adults aged 50 and older (88% white) (Carcaise-

Edinboro & Bradley, 2008). Yet, no known study has examined the role of patient-physician communication in Pap test use among limited English proficient women. Future research is warranted to identify effective intervention strategies to help promote patient-physician communication among limited English proficient Asian immigrants such as KA women in order to enable these women to understand what the Pap test is and why (or why not) they should have one.

This study also offers implications regarding the cultural competence of medical providers. In addition to known cultural descriptors—low perceived susceptibility, feelings of shame, and cancer fatalism (H. Kim, Lee, Lee, & Kim, 2004; Lee et al., 2007)—the perception about the uterus being expendable is only partially compatible with previous qualitative explorations on symbolic meanings of the cervix among KA women. For example, in the Lee et al. (2007) study of beliefs and symbolic meanings about breast and cervical cancer, most KA women predominantly related the cervix and uterus to childrearing experiences among middle-aged women or to womanhood for younger women. The KA women in our study believed that the uterus was nonessential after giving birth (as the organ had carried out its function) and this belief hindered them from getting a Pap test. Studies have reported that mothers within the Korean immigrant community play a significant role in making decisions on various matters such as children's health (Cha & Kim, 2013; K. Kim et al., 2015). Similarly, in our study, KA mothers acknowledged their responsibilities for childcare, which then affected KA mothers' views on their health. Incorporating KA women's cultural views on cervix, cervical cancer, and Pap tests into practices for cervical cancer screening can facilitate KA women's decisions about Pap tests.

Most participants faced challenges locating culturally appropriate healthcare providers in the Korean immigrant community; in turn, this negatively influenced their decision to get a Pap test. The finding suggests an urgent need to help the women navigate to gain access to culturally appropriate providers. Ample evidence supports that a community-based program including access-enhancing strategies is successful in promoting cervical cancer screening in women from diverse racial/ethnic groups including KAs (Han et al., 2011; Schuster et al., 2015). While ways in which these access-enhancing programs promote cervical cancer screening may vary, recent research reports the utility of a community health worker as a navigator, in addition to a health literacy-focused intervention to promote breast and cervical cancer screening among KA women (Schuster et al., 2015). Given that navigation services using a community health worker model were successful in promoting cancer screening among KA women, future investigation needs to address whether these particular navigation services can help to match KA women's preference for providers with physicians' characteristics.

A few study limitations need to be noted. We recruited participants from one ethnic group in one metropolitan area, which may limit the applicability of the findings beyond the study sample. However, the purpose of this study was to understand cultural descriptors of decision making in relation to Pap test use among KA women, who have been underrepresented in cervical cancer screening literature. We also used a thick description strategy by presenting contextual factors and categories with example quotes to help readers judge transferability beyond the study sample. Another limitation has to do with potential recollection bias. The study participants were asked to reflect on their experiences in relation to their decisions to receive a Pap test which happened from a few

months to several years ago. Some interview participants had difficulties remembering or articulating their decision making about having a Pap test; these women were given the time to think about their decisions and were then probed using questions from the interview guide. This may have led the result to suggest a more rational model for KA women making decisions about Pap tests.

### **Conclusions**

Understanding decision types and factors influencing decision making is a first step in developing a patient-centered decision making intervention program salient to this population, thereby facilitating KA women's desired role in shared decision making. In particular, we made recommendations for best practice in controlling cervical cancer among KA women based on the gaps between KA women's unmet needs and current practice in relation to cervical cancer screening. Future research should also consider a longitudinal, quantitative study to examine how decision making processes and outcomes influence KA women's Pap test use.

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**Table 4.1** Sample Characteristics of Qualitative Interviews (N=30)

Variables	n(%)	Mean±SD
Age, years (range=22-63)		48.6±11.8
20-30s	7(23.3)	
40s+	23(76.7)	
Marital status		
Married/partnered	22(73.3)	
Separated/widowed/divorced/never married	8(26.7)	
Years of education (range=9-20)		14.3±2.5
High school graduate or less	13(43.3)	
Some college+	17(56.7)	
Years in the United States (range=0.4-38.2)		16.9±10.0
<25% of their life	11(36.7)	
25%+ of their life	19(63.3)	
Income level		
Very comfortable/comfortable	12(40.0)	
Neutral/uncomfortable/very uncomfortable	18(60.0)	
Have health insurance	22(73.3)	
English proficiency (range=1-4)		2.9±1.1
Not at all/poor/fair	20(66.7)	
Fluent	10(33.3)	
Receive a doctor's recommendation	7(23.3)	
Pap test use ≤ 3 years		
Yes	15(50.0)	
No	15(50.0)	

**Table 4.2** Main Topics and Sample Questions used in Qualitative Interviews

Topic	Sample questions
Experiences with cervical cancer screening	<ul style="list-style-type: none"><li>• Tell me what comes to your mind when you hear cervical cancer screening tests</li><li>• Tell me about your experiences in getting cervical cancer screening tests</li></ul>
Decision making process about cervical cancer screening	<ul style="list-style-type: none"><li>• Could you tell me things that you thought about when deciding about cervical cancer screening?</li><li>• What is the most important reason for your decision about cervical cancer screening?</li><li>• How would you describe your role in the decision making in relation to cervical cancer screening?</li></ul>
Reflection on the decision	<ul style="list-style-type: none"><li>• How confident are you that you made the right decision to have the Pap test?</li><li>• Tell me how satisfied you feel about that decision.</li><li>• Tell me about your future plan for cervical cancer screening.</li></ul>

**Table 4.3** Korean American Women's Decision Types

Category	Sample quotes
Autonomous	[ <i>Interviewer: Who made the decision?</i> ] Of course I did it. ... Yeah, I was in the center of it all. Of course, I got information from my friends and also the news media. When doctors gave me recommendations, I did not just follow them blindly. I did the research first. Through the research, I learned better about the test, understood why it is necessary, and convinced myself to take the examination. So I make my own decisions.
Hierarchical	[ <i>Interviewer: When did you make the decision to receive a Pap test?</i> ] I made the decision right after the doctor recommended it. I thought I must take the test because I was sick at the time.  After I got diagnosed at the hospital, the doctor said, "I recommend you get a Pap test." Then I took the test.
Collaborative	
Husband	I usually talk to my husband about the test. "I think I may need to get a Pap test." And my husband casually asks, "Isn't it about time [to go]?" We talk [about the test]. There are these things that help me decide.
Physician	I don't think I made the decision on my own. The doctor helped me. He suggested first and after talking to him, I thought I should get tested while I am at the hospital. So I think I made the decision with the doctor.
Peer-influenced	My friend had uterine fibroids and said she had postmenopausal bleeding. So, we were like "let's do this together because I had a fibroid too." That was why we decided to go to the hospital together and got the tests including a Pap test. ( <i>Interviewer: So you went to the hospital after talking about it with your friend?</i> ) Yes, we made an appointment together and went to the hospital on the same day.

**Table 4.4** Barriers to Decision about Pap Test Use

Category	Sample quotes
Lack of awareness/limited knowledge about cervical cancer and Pap test	The doctor did a test on my uterus and then checked if I had breast cancer, using a machine. That was it. [Interviewer: <i>Usually they collect the cell using a Q-tip or a brush on the cervix. And then they put it in a jar and...</i> ] Yes, yes, that's it. So I did get a Pap test.
Perceptions and beliefs about cervical cancer and Pap test	<p><b><i>Feeling of shame:</i></b> Even though it's in front of a doctor, I feel extremely humiliated when I spread my legs. I'm fine with showing my breasts but it's very difficult to expose down there.</p> <p><b><i>Uterus is expendable:</i></b> I didn't worry too much about my uterus. I thought I could just remove it if there is a problem. So I wasn't so concerned.</p> <p><b><i>Low perceived susceptibility:</i></b> I'm pretty healthy. I delivered all my children just fine and had menstruation without any pain. So I don't worry so much about OB/GYN checkups.</p> <p><b><i>Cancer Fatalism:</i></b> When she [her sister who has been diagnosed with breast cancer] showed up wearing a wig, I thought my heart stopped pounding. That's how I feel now... I am so sad and just realized, "the screening and treatment... are all meaningless. That is cancer."</p>
Repeating normal results	Everything was normal when I took the tests. I didn't see why I should get a Pap test again when there wasn't anything positive.
Difficulties in finding culturally appropriate providers	If possible, I would like my doctor to be competent. It would be nice if she were a woman and even better if she could speak Korean. But it's very difficult to find a doctor who meets all the three conditions, especially at the OB/GYN clinic.
Fragmented healthcare system	When I go to the OB/GYN, they tell me to go somewhere else to receive a mammogram... Because the medical system here is all so fragmented, there are many inconvenient situations [such as having to make multiple visits to get a cancer screening done].

**Table 4.5** Facilitators of Decision about Pap Test Use

Category	Example quotes
Perceptions about cervical cancer and the Pap test	<p><b><i>A belief that cervical cancer will be cured if detected early:</i></b> Many people say if you get diagnosed at an earlier stage, cervical cancer can be cured and you can get better faster. So, I get myself tested to examine my health.</p> <p><b><i>Fear about cervical cancer:</i></b> Cancer is terrifying. That's why I should go.</p> <p><b><i>Mother should be healthy:</i></b> I think it was more about being responsible. I'm a housewife and a mother so my health affects the happiness of my family. Therefore, I must be healthy.</p>
Peer pressure to get a Pap test	<p>My friends take care of themselves a lot better than I do. They go to the hospital religiously, take all kinds of regular checkups and are very committed to their health. I think I should be like them.</p>



**Table 4.6** Korean American Women's Decision Reflection

Category	Sample quotes
Women with a recent Pap test	
I am glad I did	I was proud that I was able to go through the healthcare system to get the examination [in English]. I was glad that I got the test and felt very relieved. I would like to get tested once more.
Being neutral	Every time I had an examination, the results turned out to be normal. Now I don't feel as nervous as I did before. I just think I will be alright. I still get myself checked regularly but I no longer worry that I might have a problem.
Being ambivalent	I was like "OK, just get over it [Pap test] this time." But if I were able to go back in time when I made the decision, I might not have gotten the test because I needed to show my private parts to the physician. ... But, I became to know the importance of a regular screening after the visit. ... Well... I have mixed feelings about the decision.
Women without a recent Pap test	
Being confident with the decision	I had done checkups once every few years before I came to America [13 years ago]. Also, I often see my friends going to the OB/GYN because they have an infection in their uterus, but I had never experienced noticeable symptoms. So I am kind of confident about my decision [to not get a Pap test].
Just living with the decision	I'd like to go [to get a screening], but there's nothing I can do about it. My situation [that I can't take time off from work] is not quite favorable. So I just live with my decision [to not get a Pap test] believing that I will be alright.

## CHAPTER FIVE: DISCUSSION

### Introduction

Cervical cancer is one of the leading cancers in women worldwide, largely because of a lack of regular screening (Ferlay et al., 2015). Health literacy has emerged as a critical means of improving compliance with cervical cancer screening guidelines (Nutbeam, 2000; Ratzan & Parker, 2000). However, there has been scarce research on Pap test use in relation to health literacy among one of the fastest growing yet understudied Asian immigrant groups with higher burden of cervical cancer: Korean American (KA) women. The purposes of this study are to (1) understand the mechanisms by which health literacy is associated with Pap test use; and (2) explore decision making about a Pap test. This study used secondary analysis of cross-sectional data obtained from a community-based randomized controlled trial to promote mammogram and Pap test use (hereafter “parent study”) and in-depth, semi-structured interviews among KA women residing in the Baltimore-Washington Metropolitan Area.

The sample consisted of 560 women who completed a quantitative survey. A purposive sample of 30 women participated in semi-structured individual interviews to contribute to the understanding of KA women’s decision making about a Pap test. The two aims for this study are as follows.

**Aim 1:** To examine the relationships between health literacy, psychosocial determinants (cervical cancer knowledge, decisional balance for a Pap test, worry related to cervical cancer examination, cervical cancer self-efficacy,

or perceived social support), and Pap test use within the preceding three years, even after controlling for sociodemographic and system factors.

**Hypothesis 1a:** Higher health literacy would be associated with the following psychosocial determinants: (1) more cervical cancer knowledge, (2) positive decisional balance, (3) less worry about cervical cancer examination, (4) higher cervical cancer self-efficacy, or (5) higher perceived social support.

**Hypothesis 1b:** Higher health literacy would be associated with Pap test use in the preceding three years than lower health literacy.

**Hypothesis 1c:** The association between health literacy and Pap test use in the preceding three years is attenuated if psychosocial determinants are added to the model: (1) cervical cancer knowledge, (2) decisional balance for a Pap test, (3) worry related to cervical cancer examination, (4) cervical cancer self-efficacy, or (5) perceived social support.

**Aim 2:** To explore KA women's decision making about a Pap test.

**Research Question 2a:** How did KA women make a decision about their Pap test use?

**Research Question 2b:** What prohibits or facilitates KA women's decision to undergo a Pap test?

**Research Question 2c:** How did KA women reflect on their decision to receive or not to receive a Pap test?

This chapter summarizes the main study findings by specific aims, integrating quantitative and qualitative findings. Following is a discussion of the strengths and limitations of this study, implications for health science as well as clinical practice, and recommendations for future research.

## **Main Findings**

### ***Associations between health literacy, psychosocial determinants, and a Pap test (Aim 1)***

Based on a comprehensive literature review and the framework of health literacy and health actions (von Wagner, Steptoe, Wolf, & Wardle, 2009), five psychosocial determinants were selected and examined as indicators of a psychosocial construct of a Pap test: cervical cancer knowledge, decisional balance for a Pap test, worry related to cervical cancer examination, cervical cancer self-efficacy, and perceived social support. After measurement model testing, three psychosocial indicators—cervical cancer knowledge, decisional balance for a Pap test, and cervical cancer self-efficacy ( $p < 0.001$ )—constituted a final measurement model for the psychosocial construct of a Pap test. We then developed two structural models to test the associations between health literacy, psychosocial construct of a Pap test, and Pap test use using structural equation modeling: Model 1 (a full model) examined the coexistence of a *direct* effect of health literacy on Pap tests and an *indirect* effect of health literacy on Pap tests through a psychosocial construct of a Pap test (mediator); Model 2 (a nested model) tested only the *indirect* effect of the relationship through a psychosocial construct of a Pap test. Based on chi-square difference testing to compare a nested model relative to a full model (chi-square=1.548,  $df=1$ ,  $p=0.2135$ ), we chose a nested model that had only an indirect pathway between health literacy and Pap test use.

The finding implies that KA women's levels of health literacy was indirectly associated with their Pap test use within preceding three years through a psychosocial construct of a Pap test. This finding is congruent with previous studies of self-care in the context of diabetes (Brega et al., 2012; Leung, Cheung, & Chi, 2014; Osborn, Bains, & Egede, 2010) and self-care (Wang et al., 2014). In the context of cervical cancer control, only one study tested the indirect effect in a Taiwanese sample (N= 1,754) (Lee, Tsai, Tsai, & Kuo, 2012). In the study (Lee et al., 2012), general health knowledge was tested as a potential mediator between health literacy and Pap test use but the mediation effect was not significant. These findings are discussed in Manuscript 2.

We conducted a separate systematic review of health literacy and cervical cancer screening in which knowledge, cancer worry, and perceived barriers to a Pap test found to be potential mediators (Manuscript 1; Kim, in press). Of the 12 articles included in the review, five studies investigated the relationships between health literacy, knowledge, and Pap test use. Of those five studies, four found that health literacy was associated with cervical cancer knowledge (Garbers & Chiasson, 2004; Lindau et al., 2002; Schapira et al., 2011) or general health knowledge (Lee et al., 2012); Bynum et al. (2013) found no significant association between health literacy and cervical cancer knowledge among women living with HIV. Two studies found that higher health literacy was significantly associated with lower cancer worry (Lindau et al., 2002; Schapira et al., 2011).

Knowledge (Lee et al., 2012; Schapira et al., 2011) and perceived barriers to cancer screening (Schapira et al., 2011) were separately associated with cancer screening. For example, Schapira et al. (2011) found direct associations of higher knowledge (OR

1.06; 95%CI 1.02 to 1.08) and lower perceived barriers (OR 0.93; 95%CI 0.92 to 0.95) with cancer screening (breast, cervical, colorectal cancer) in multiple regression models.

Together, our study findings and the results of our systematic review add to the literature by offering evidence supporting potential pathways that link health literacy to Pap test use, which is suggested in von Wagner et al. (2009). Quantitative results supported our hypotheses for the following psychosocial determinants: cervical cancer knowledge, decisional balance for a Pap test, and cervical cancer self-efficacy. Our structural equation modeling analysis did not support a path between health literacy and cancer worry (worry related to cervical cancer examination) as supported in Schapira et al. (2011). We conducted sensitivity analysis to examine the association between health literacy and cancer worry using multiple regression analysis. Health literacy was not a predictor of worry related to cervical cancer examination ( $b = -1.06$ ; 95%CI: -2.47 to 0.34;  $p = 0.138$ ) after controlling for sociodemographic and system factors. The finding is consistent with the results of our structural equation modeling. Future research should examine whether our study findings can be replicated in other ethnic groups and also investigate whether cancer worry mediates the association between health literacy and Pap test use among women with other ethnic groups as well as KA women. Additional qualitative investigation may help understand how cancer worry influences KA women's decision making about a Pap test.

### ***Explore decision making regarding a Pap test among KA women (Aim 2)***

Qualitative interview participants offered keen insight into KA women's decision making about taking a Pap test. These types of decision making varied. Most interview

participants claimed they made the decision themselves, after researching information from various sources (autonomous decision making). The finding is congruent with a recent study of Australian women (N=1,279) in which 87% of women preferred to be actively involved in decision making about taking a Pap test (Dieng, Trevena, Turner, Wadolowski, & McCaffery, 2013). Nonetheless, some KA women who received a physician's recommendation indicated that they followed that recommendation (hierarchical decision making). A few women made a decision with their husband (collaborative decision making) or with other women (peer-influenced decision making).

In the qualitative interviews, KA women's decision to have a Pap test was influenced by multiple barriers and facilitators. Among these barriers at the individual level were a lack of or limited knowledge, the women's perceptions and beliefs about a Pap test and cervical cancer (e.g., feeling of shame, a belief that the uterus is expendable, low susceptibility, and cancer fatalism), and repeating normal results. System-level barriers were difficulty finding culturally appropriate providers and a fragmented healthcare system. Facilitators of Pap test decisions included the women's perceptions and beliefs about a Pap test and cervical cancer (a belief that cervical cancer will be cured if detected early, fear about cervical cancer, mothers should be healthy) and peer pressure. Several women reported that their fear of cervical cancer might keep them from having a Pap test; however, most women mentioned that their fear of cervical cancer was an incentive to have a Pap test.

Reflecting on the decision was a significant component of decision making. Among the women who had received a Pap test within the last three years, most were glad that they had had the test and reported that they would make the same decision again.

Though some women with negative Pap test results were ambivalent about their decision due to mental distress associated with the tests. Others were neutral after having had several normal Pap tests. This finding is congruent with a previous study on decision making for colorectal and prostate cancer screening among a representative sample of adults aged 50 and older (Hoffman et al., 2014). In the study, more than half (55% in prostate cancer screening and 76% in breast cancer screening) who underwent screening reported that they certainly would make the same decision again, whereas others were either unsure or definitely would not do so.

### **Additional Findings**

This study used a health literacy instrument in the context of cancer screening that was developed based on Baker's health literacy framework (Baker, 2006; Han, Huh, Kim, Kim, & Nguyen, 2014). Guided by the same, Baker's theoretical foundation regarding health literacy, an effort was made to synthesize health literacy construct in this study. Structural equation model analysis showed that the construct of health literacy consisted of familiarity, comprehension, reading ability, navigation, and numeracy as described by Baker (2006).

A physician's recommendation was not only a significant correlate of KA women's health literacy, but also a correlate of a psychosocial construct of a Pap test and women's Pap test use. This finding supports part of von Wagner et al.'s health literacy framework that suggests that accessibility of health information (i.e., patient-clinician communication) influences psychosocial determinants that then lead to a desired health behavior (e.g., undergoing cervical cancer screening) (von Wagner et al., 2009).

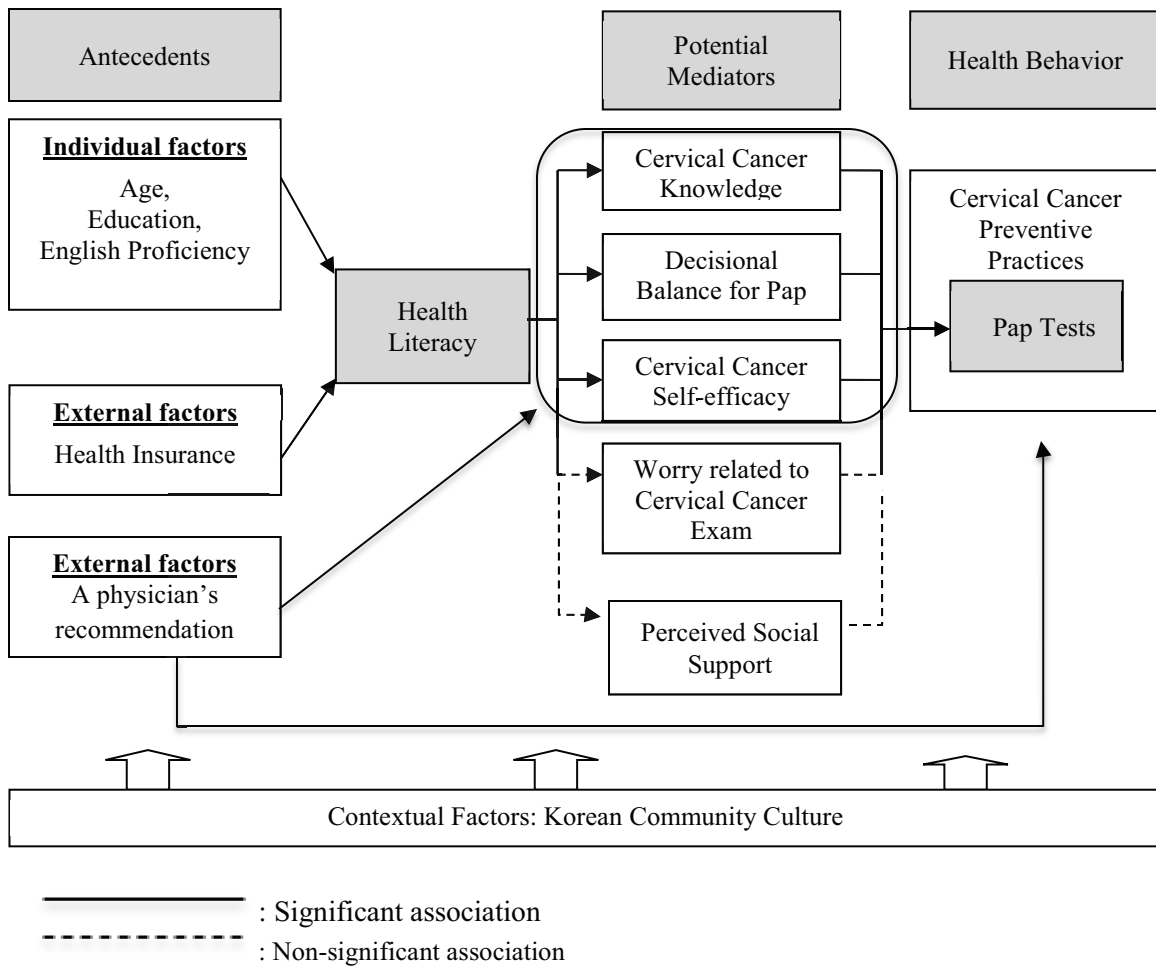


## **Discussion Summary**

The purposes of this study are to (1) understand the mechanisms by which health literacy is associated with KA women's Pap test use, and (2) explore decision making about a Pap test. This study used a cross-sectional correlational study design. Using secondary analysis of baseline data obtained from the parent study, we sought to examine the associations among health literacy, psychosocial determinants, and use of a Pap test. In addition, using in-depth, semi-structured individual interviews, KA women's decision making about a Pap test was explored in great details.

This study offers quantitative evidence that health literacy, psychosocial determinants of a Pap test (i.e., cervical cancer knowledge, decisional balance for a Pap test, and cervical cancer self-efficacy), and a physician's recommendation influence Pap test use among KA women. Based on the findings from the quantitative inquiry, the conceptual model is presented in Figure 5.1.

**Figure 5.1.** Final Model of Health Literacy and Pap Test Use among KA Women



A qualitative investigation sheds light on an understanding of how KA women make a decision about a Pap test. While there have been many discussions of shared decision making in cancer screening, our qualitative investigation is one of the first to inform decision making about Pap test use that appears to be shaped by culturally salient factors at the individual and the system levels. Culture-specific factors influencing KA women's decision to get a Pap test (e.g., motherhood, uterus being expendable) should be incorporated into education programs or clinical practices to encourage having a Pap test. In addition, understanding different decision types in KA women can be used to tailor an intervention to encourage getting a Pap test. For example, for KA women who exhibit autonomous decision making, information about cervical cancer and a Pap test through

an educational intervention could be helpful. For KA women who make hierarchical decisions, primary care providers or gynecologists should be trained to start conversations about the Pap test.

It is also noteworthy that this study used a measurement that assessed health literacy in cancer screening, and that a measurement model for health literacy construct was then developed. To the best of our knowledge, this is the first study to construct the concept of health literacy using theoretically driven indicators of health literacy (Baker, 2006) to examine the association between health literacy, psychosocial determinants, and Pap test use. We used psychosocial factors hypothesized by von Wagner et al.'s health literacy framework to synthesize a psychosocial construct of a Pap test. Evidence can be a more accurate representation of the associations among these variables because this study is not bound by measurement errors.

### **Integration of Quantitative and Qualitative Findings**

A portion of the qualitative data (data not presented in Chapter 4) provided an additional explanation of the quantitative findings, which showed non-significant associations of cervical cancer worry and perceived social support with Pap test use. A majority of interview participants noted that fear of cervical cancer diagnosis could both promote and hinder their Pap test use. A body of literature has reported an inverted u-shaped pattern regarding the association between worry about cancer and use of breast cancer screening: They found that an optimal amount of worry could facilitate mammogram use, but too much might inhibit their mammogram use (Andersen, Smith, Meischke, Bowen, & Urban, 2003; Hailey, 1991; Zhang et al., 2012). No known studies have examined how cancer worry affects the decision-making process to undergo

cervical cancer screening. Our study findings indicate a need for further investigations regarding the role of cervical cancer worry in receiving a Pap test.

While perceived social support (e.g., feeling cared for and loved) was not one of the recurrent categories associated with KA women's decision about getting a Pap test, a number of women described that having tangible support (e.g., transportation and financial aid) from friends or family helped them get a Pap test. This indicates that tangible support, rather than perceived social support, is more important in facilitating Pap test use. Previous studies have highlighted that tangible support was successful in eliminating barriers to Pap test use among KA women, thereby improving their Pap test use (Ma et al., 2009; Schuster et al., 2015; Wismer et al., 1998). This study did not use a measurement designed to capture tangible support within the context of cervical cancer screening. Future research should consider measuring tangible support and examine its potential role as a mediator or a moderator in the relationship between health literacy and Pap test use.

### **Strengths and Limitations**

This study has several limitations. Due to the nature of cross-sectional data, causality cannot be inferred. Thus, the quantitative finding should be interpreted with caution. The survey sample included women who were overdue for Pap test screening; they were also recruited from a single metropolitan area, thus limiting the generalizability of the quantitative findings. Similarly, the findings from qualitative interviews may not be applicable to KA women in other contexts, which refers to limited transferability. Yet, by providing contextual factors and categories and example quotes, we made an effort to

ensure the transferability of the study findings. Study variables including women's Pap test use were assessed by self-reporting. Thus, Pap test status might have been over- or under-reported. Due to a limitation in statistical computation with Mplus, the traditional model fit indices could not be produced. In order to estimate the conventional model fit indices, we adopted an additional estimation method (i.e., a weighted least squares means and variance adjusted estimation approach) to estimate model fit indices. Some interview participants had difficulties remembering or articulating their decision making about Pap test use; these women were given the time to think about their decisions and were then probed using questions from the interview guide, which might have led the result to suggest a more rational model for KA women making decisions about a Pap test.

This study has multiple strengths. The use of cross-sectional survey data and in-depth individual interviews can provide a more comprehensive understanding of KA women's decision about a Pap test. Furthermore, we used a multidimensional health literacy measure designed to capture cancer screening-specific health literacy that has been validated in KA women. In addition, we took advantage of structural equation modeling analysis to examine potential links between health literacy and Pap test use: allowing latent variables by synthesizing multiple indicators for each construct such as health literacy, adjusting for measurement errors in endogenous variables, and simultaneously investigating all hypothesized relationships (Bollen, 1989). To the best of our knowledge, this is the first study to examine the associations between KA women's health literacy, psychosocial determinants of a Pap test, and their Pap test use, offering insight to decision making process in regard to a regular Pap test use among KA women, who are at high risk of cervical cancer.

## **Implications for Health Science**

There are implications from this study for clinicians and researchers. In particular, nursing is a holistic discipline designed to enhance to human health and well-being. This indicates that nurses and advanced practice nurses who have a holistic perspective are uniquely positioned to advance research and clinical practice on Pap test screening behavior that has known to be influenced by multifaceted factors. However, there has been little research on cervical cancer prevention and control by nurses. Nurses can bring their perspectives to assess KA women's needs in relation to their decision to get a Pap test (e.g., lack of discussion on Pap tests) and provide culturally sensitive and comprehensive counseling that removes barriers to and encourages Pap test use.

Nurses are highly regarded in testing an intervention to eliminate disparity in cervical cancer screening behavior in relation to health literacy. In other words, nurses who conduct an initial encounter with patients and who are in frequent contact with patients are well suited to implement a patient-centered intervention. There are two components of a nurse-led intervention: increasing patients' health literacy and educating nurses to communicate in clear and non-technical language. This is critical because not only levels of an individual's ability but also the demand of a particular task under a certain circumstance influence whether or not individual is considered health literate. The role of nurses in lowering the required levels of health literacy to accomplish a task is essential. Helping women understand their options and make an informed decision based on their belief system may be the first step empowering recent immigrant women who have limited health literacy and who not been sufficiently studied in the U.S.

## **Implications for Theory**

von Wagner et al.'s framework of health literacy and health actions (2009) provides a theoretical framework to examine a range of health behaviors such as the adoption of preventive practices by incorporating health literacy into social cognitive models of health (Theory of Planned Behavior; Ajzen, 1991; Health Belief Model; Janz & Becker, 1984) based on previous plausible causal pathways between health literacy and health suggested by Paasche-Orlow and Wolf (2007). Our study will fill the research gaps on the associations between health literacy, psychosocial determinants of a Pap test, and preventive practices such as cervical cancer screening behavior, described in Chapter One. From the quantitative data, we found supporting evidence for health literacy, psychosocial determinants of a Pap test (i.e., cervical cancer knowledge, decisional balance for a Pap test, and cervical cancer self-efficacy), and a physician's recommendation as predictors of KA women's decision to have a Pap test. We did not find support for worry related to cervical cancer examination and perceived social support operationalized in the modified theoretical framework. In the qualitative results, most interview participants described fear of cervical cancer could both promote and inhibit Pap test use. In addition, tangible rather than perceived social support (e.g., feeling cared for and loved) appeared to be associated with Pap test use. Other categories relevant to psychosocial determinants that were not discussed in von Wagner et al.'s theoretical framework also emerged in qualitative interviews, such as cancer fatalism and motherhood. The findings suggest that the associations hypothesized in von Wagner et al.'s health literacy framework are comprehensively demonstrated using quantitative and qualitative approaches; the incorporation of qualitative data preserves the individual

perspectives in regard to the decision to receive a Pap test. This is essential when investigating a complex topic such as immigrant women's decision to receive a Pap test.

In future research on a Pap test screening behavior, it may be worthwhile to test the relationships that are discussed in qualitative interviews, which then inform the modification of von Wagner et al.'s health literacy framework. For example, one could study the association between health literacy, social support, and Pap test use by measuring tangible support. In addition, culture-specific psychosocial determinants that emerged in qualitative interviews of KA women, such as cancer fatalism and motherhood, could be tested in the context of cervical cancer control. The findings of these studies could provide quantitative evidence to support cancer preventive practices as posited by von Wagner et al. (2009), thereby guiding clinical practice and adding to the distinctive body of knowledge.

### **Recommendations for Future Research**

The results of this study offer several directions for future research on Pap test screening behavior. Additional research is warranted on relationships between health literacy, cancer-specific theoretically grounded psychosocial determinants, and Pap test use with diverse populations, including evaluation of mediating effect of culture-specific emergent psychosocial determinants on a Pap test screening behavior. Replication of this study with an economically and geographically diverse sample of women who have and have not received regular Pap tests would advance the understanding of the associations examined. In addition, there is an urgent need for longitudinal research on Pap test use, as the present study and the published literature are cross-sectional. Longitudinal research



would allow examination of the causality of behavior that could contribute to designing an intervention to promote having Pap tests.

The results of this study also have implications for experimental studies with an intervention specific to health literacy, psychosocial determinants, and Pap test use among KA women. First, the results of this study could elucidate the ways in which a tailored intervention can be designed. Addressing the psychosocial factors of a Pap test salient to KA sample and encouraging providers to open a conversation about a Pap test using plain language as well as improving health literacy appear to be best ways to encourage KA women to have regular Pap tests. Nonetheless, given KA women's decision types, there is a need for a patient-clinician communication intervention component so that KA women understand their options so that they can arrive at an appropriate decision based on their autonomy. In addition, an effort to improve medical providers' cultural competence should be incorporated into the patient-clinician communication intervention to attract KA women to the U.S. healthcare system and who reside in an area that has few language- and race-concordant providers.

### **Summary**

Despite notable strides in controlling cervical cancer in the U.S., cervical cancer remains a significant health problem among women of racial and ethnic minorities. Health literacy is uniquely positioned to reduce disparities in cervical cancer screening by influencing theoretically driven psychosocial determinants. Unceasing research examining the influence of health literacy on cervical cancer screening behaviors at the individual, community, and system factors is warranted to increase the rates of Pap test

use among women from racial/ethnic minorities who have limited health literacy, such as KA women.

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## **APPENDIX A: STUDY INSTRUMENTS**

### **Interview Guide for In-Depth Interviews**

**Setting:** A private room at the Korean Resource Center in MD, an ethnic church, or private place of the interviewee's choosing

**Interview Length:** 60-120 minutes

**Interviewer:** Kyounghae Kim, Principle Investigator (P.I.)

**Equipment:** Two digital recorders with extra batteries, notepad for recording field notes, small snacks and beverages for interview participants

[Brackets indicate instructions to the P.I.]

#### **A. Introduction**

[The P.I. introduced herself to each participant and written informed consent was obtained. Each participant had just completed a brief quantitative survey that is distributed by the P.I. in person.]

Hello. How are you today? I want to thank you for taking the time to come here and participate in this study. We just finished the survey portion of this study, which asked you to choose one best answer for each question. Unlike the survey part of this study, now, I want to hear about your experiences and thoughts in relation to cervical cancer screening.

Just to give you some idea on what to expect during this interview, I will start off with very broad questions about your experiences with and perceptions of cervical cancer screening. Different people may have different experiences and thoughts about cervical cancer screening. I also would like to learn how Korean women learn health-related information. There is no right or wrong answer. Do you have any questions so far?

Since what you share with me today is important, I want to ask if you feel comfortable if I record this interview. With your permission, I may also take notes during the interview. The notes and recordings will be used only for study purposes. You may refuse to answer any questions you do not want to answer if you do not feel comfortable. You may also stop this interview at any time if you feel you want to take a break.

Is it okay for me to start recording this interview now? (After the participant says, "Yes" the P.I. will start the interview.)

[Start recording.]

#### **B. Interview**

##### **1. Experiences with Cervical Cancer Screening**

[For Korean-American women who have received at least one Pap test]



“We are interested in learning about Korean-American women’s experiences with cervical cancer screening. Could you take about 5 minutes – or as long as you need – and tell me about your experiences in getting cervical cancer screening tests?”

[Wait for response. The PI will use probe questions, if needed.]

Possible Probes:

1. “What comes to your mind when you hear cervical cancer screening test?”
- 2-1. “Could you describe a series of your experiences in receiving a cervical cancer screening test?”
- 2-2. “How would you describe your feelings in relation to your experiences?”
3. Have you had abnormal Pap results? “Tell me what you did when you received an abnormal Pap test result.”
- 4-1. “How would you compare your experiences with cervical cancer screening here in the United States versus your experiences in South Korea?”
- 4-2. “How would you compare your experiences in receiving cervical cancer screening to the experiences in seeing the doctor due to other types of health concerns, such as common cold?”
- 5-1. “What are some things your healthcare provider (or other staff in the office) did not do that you wish he/she would have done?”
- 5-2. “What are some things your healthcare provider (or other staff in the office) did that you wish he/she had not done?”

[For Korean-American women who never received a Pap test]

“We are interested in learning about Korean-American women’s thoughts on a Pap test. Would you please take about 5 minutes—or as long as you need—to tell me what comes to your mind when you hear cervical cancer screening test?”

## **2. Decision Making for Cervical Cancer Screening**

“We just talked about your experiences in relation to cervical cancer screening. Now, I would like to learn about how you made the decisions. Could you tell me things that you thought about when deciding about cervical cancer screening?”

[Wait for response. The PI will use probe questions, if needed.]

Possible Probes:

1. “What particular things were you concerned about?”
2. “What are the things that influenced your decision to undergo cervical cancer screening?”

3 “What were your expectations about your decision to undergo cervical cancer screening?”

Thank you for sharing your thoughts and experiences. During the survey and previous interviews, I have learned about possible factors influencing Korean women's decision to have cervical cancer screening. Now, I would like to have a more in-depth discussion about the factors that I have learned from the study procedures. Please feel free to stop me if you have any questions.

[The P.I. will ask the following questions only if/when relevant.]

1. Some people say that having enough correct information about cancer screening was important when deciding about cervical cancer screenings. However, others say that this did not matter to them when making their decision.

“What do you think of its influence on your own decision?”

2. Some women say that they experience fear regarding the Pap test itself or regarding the possibility that they might have abnormal test results or cancer. Meanwhile, others say that they do not experience fear in relation to the procedure or possibly abnormal results.

“What do you think of its influence on your own decision?”

3-1. “Have you observed another person make a decision (e.g., friends or family)?”

3-2. “Have you received positive feedback from others regarding the decision?”

3-3. “What do you think of your above experiences on your own decision making process in relation to a Pap test?”

4. Some women say that social support—such as feeling loved (or supported) by their family and friends, having a confidant, receiving financial assistance, receiving relevant information from others, or having family and friends who underwent a Pap test—helped them to make the decision regarding obtaining a cervical cancer screening. However, others say that this did not matter to them when making their decision.

[Emotional/Tangible/Informational/Companionship]

“Tell me what you think about the support you received from others in relation to your cervical cancer screening decision-making.”

5. Sometimes limited English understanding and unfamiliarity with the U.S. healthcare system keeps people from getting cervical cancer screenings. Others say that English proficiency does not influence their decision regarding screening.

“Can you tell me more about your own experience?”

6. “Tell me more about your feelings if you were told that you need to get a Pap test by a physician.”

We have discussed a lot of things here today,

“What is the most important reason for your decision about cervical cancer screening?”

Thank you for your response. I have already learned a lot. Now, I would like to know about your role in decision making regarding cervical cancer screening.

“How would you describe your role in the decision making in relation to cervical cancer screening?”

[Wait for response. The PI will use probe questions, if needed.]

Possible Probes:

1. “Who made the decision (physician, friend, family, or yourself)?”

### **3. Reflection on the Pap test Decision**

Thank you for your response. Now, I would like to learn more about how you reflect on your decision.

“How confident are you that you made the right decision to have the Pap test?”

“Tell me how satisfied you feel about that decision.”

“Tell me about your future plan for cervical cancer screening.”

Ending questions

“Thank you so much for sharing your thoughts and experiences. I do not have any more questions. Is there anything else you would like to add or share with me before we end the interview?”

### **C. Closure**

If there is nothing else you would like to add to the interview, then we can bring the interview to a close.

[The P.I. will stop recording the interview and stop taking notes.]

[The P.I. will give the interview participant honorarium as indicated in the study protocol (\$30).]

### **Important Prompts**

1. If/when an interview participant appears to get off track: “I would like to be careful about your valuable time, and would like to make sure that I learn about all your experiences and thoughts. I would like to move on to the next question if you are okay with it.”
2. If/when an interview participant appears to become distressed: “If this interview makes you distressed, we can always stop or cancel the interview and talk about resources available to you.”

[The PI will pause the interview as soon as possible and assess the interview participant. The P.I. will provide psychological support if needed. Participants will once again be informed that they can withdraw from this study at any time and then will be asked whether they would either suspend, resume, or cancel the interview. Participants will receive a list of resources for counseling or will be referred for medical care, if necessary.]

## Survey

### Assessment of Health Literacy in Cancer Screening (AHL-C)

#### Rapid Estimate of Adult Literacy in Medicine: REALM Breast & Cervical exam

1. Please read out loud the listed words below.

List (12)	
Benign	
Biopsy	
Cervix	
Gynecology	
Human papillomavirus	
Hysterectomy	
Malignant	
Mastectomy	
Metastasis	
Pelvic	
Uterus	
Vagina	

## Familiarity

**2. The following questions are asking about how familiar you are to the words below. Please check the answer that describe the words appears to be most appropriate.**

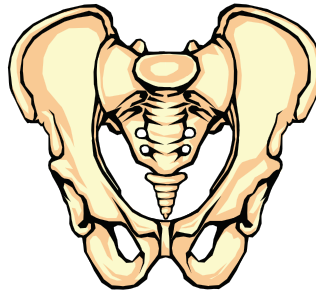
	Never heard before	Ever heard before	Heard a little, but not familiar	Heard frequently and familiar	Can use fluently
Benign	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
Biopsy	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
Cervix	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
Gynecology	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
Human papillomavirus	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
Hysterectomy	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
Malignant	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
Mastectomy	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
Metastasis	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
Pelvic	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
Uterus	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
Vagina	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05

## Comprehension

3. Please link the word on the left with the corresponding picture on the right.

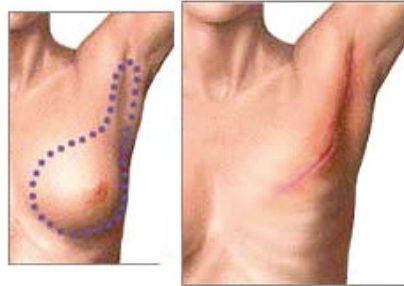
Mastectomy •

•



Pelvic •

•

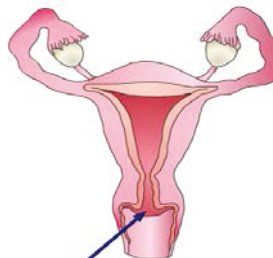


Cervix •

•



•



4. Please link the word on the left with the corresponding Korean word on the right.

1)	<b>Hysterectomy</b> <b>Benign</b> <b>Human Papillomavirus</b>	• • •	• 골반 • 인유두종 바이러스 • 자궁절제술 • 양성
2)	<b>Gynecology</b> <b>Uterus</b> <b>Vagina</b>	• • •	• 자궁 • 산부인과 • 피임약 • 질

5. Please choose the correct definition of the listed word.

1) **Biopsy**

- A. 생체
- B. 임상검사
- C. 생검
- D. 부검

2) **Metastasis**

- A. 암세포가 없어진 것
- B. 암세포가 전이된 것
- C. 암세포가 커진 것
- D. 암세포가 줄어들 것

3) **Malignant**

- A. 악성종양
- B. 염증
- C. 전암단계
- D. 임신

## Healthy navigational literacy in Cancer Screening

**Please read the following select the right word in the blank.**

6-1. Please sit down and roll up your sleeve. I will measure your \_\_\_\_\_.

- A. blood pressure
- B. diabetes
- C. suture
- D. nausea

6-2. Please have a seat.

While you are waiting, please fill out this **(a)** \_\_\_\_\_.

Do you have your **(b)** \_\_\_\_\_ card with you?

**(a)**

- A. appointment
- B. medication
- C. visit
- D. form

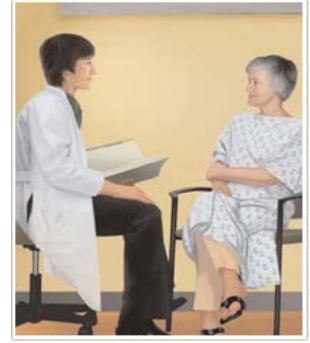
**(b)**

- A. insurance
- B. spouse
- C. weight
- D. hormone



Below is about the situation of discussion with the doctor about breast test.

Please read the sentence and choose the right answer.



6-3. **Doctor:** When you check your breast, please tell me whether you have abnormal symptoms, such as **(a)** \_\_\_\_\_ in your breast or **(b)** \_\_\_\_\_ from your nipple.

**(a)**

- A. appointment
- B. medication
- C. lump

**(b)**

- A. discharge
- B. urine
- C. anemia

6-4. **Doctor:** If you feel any changes in your breasts during self-examination, call us to make an appointment for \_\_\_\_\_.

- A. meal
- B. mammogram
- C. symptom

**Please read the sentence and answer the questions.**

**Receptionist:** Hello. This is Ellicott City Radiology. How can I help you?

**Ms. Kim:** Hi. I would like to make an appointment for a mammogram.

**Receptionist:** OK. Can I have your name and address please?

**Ms. Kim:** My name is Sook Kim. The address is 3201 Rogers Ave. Ellicott City, 21043.



6-5. For what test appointment does Mrs. Kim makes a call?

\_\_\_\_\_

6-6. To what place does Mrs. Kim call for this test?

\_\_\_\_\_

**Below are the situations that the person discuss about the risk factors about the vaginal cancer.**

**Doctor:** Does anybody in your family have cervical, ovarian or breast cancer?

**Mrs. Kim:** Yes. My sister had a (a)\_\_\_\_\_ because she had a (b)\_\_\_\_\_ in the uterus. I heard about the virus that casue cervical cancer. What is it?

**Doctor:** \_\_\_\_\_

6-7. Please select the right word in the blank.

**(a)**

- A. cervix
- B. brain
- C. surgery

**(b)**

- A. tumor
- B. diagnosis
- C. visit

6-8. What does the doctor answer to the Mrs. Kim's question?

- A. HPV (human papillomavirus)
- B. Dust
- C. Influenza virus

6-9. What is the right test for the explanation below the sentence?

It checks for changes in the cells of your cervix by obtaining cervix cells using a long swab. The cervix is the lower part of the uterus (womb) that opens into the vagina (birth canal).

- A. X-ray
- B. Pap smear
- C. endoscopy
- D. MRI

## Numeracy Testing

7. Below is the food label of a pizza. Please read and answer the questions.

7-1. If you eat a piece of a pizza, how many calories will you take?

\_\_\_\_\_

7-2. If you eat a piece of a pizza for lunch, how many calories of saturated fat you take?

\_\_\_\_\_

7-3. The doctor advises you to reduce the cholesterol. If you do not eat a slice of pizza following that advice, how many calories you reduce?

\_\_\_\_\_

7-4. If you eat whole box of pizza, how many calories you take?

\_\_\_\_\_

### Modified Cervical Cancer Knowledge Test (MCCK)

The following questions are about cervical cancer. Please read carefully and choose one answer.

	True	False	Don't know
1. Women that have never been pregnant will not get cervical cancer.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 99
2. If one gets cervical cancer, she will feel the symptoms.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 99
3. Women that are not sexually active will not get cervical cancer.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 99
4. Women who have been pregnant/delivered babies many times have a greater likelihood of getting cervical cancer.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 99
5. If cervical cancer is detected early, it can be completely treated.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 99
6. If one gets screened for cervical cancer, it can be detected early.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 99
7. Women who were sexually active since their teenage have a greater likelihood of getting cervical cancer.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 99
8. If one smokes heavily, the risk for cervical cancer increases.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 99
9. Cervical cancer is more common, as age increases.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 99
10. Women who work while standing up for long periods of time have a greater risk for getting cervical cancer.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 99
11. A person may be infected with HPV and not know it.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 99
12. Contacting certain types of HPV can increase your chance of developing cervical cancer.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 99
13. All types of HPV can be prevented by vaccination	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 99
14. HPV is transmitted or spread via genital contact	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 99
15. A person who has HPV may need to have Pap smears more often than others	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 99
16. HPV infection can be cured with the right treatment	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 99
17. HPV can be transmitted or spread via simple skin contact	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 99
18. Pap smear can detect HPV	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 99
19. The HPV vaccine is most effective if given before to women who are sexually active	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 99
20. If a women has regular PAP smears, she will not get HPV	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 99

### Decisional Balance for a Pap Test

In regard to taking a Pap smear, the following questions are asking about how you make your decision while considering perceived risks and benefits. Please read carefully and choose one answer.

	Strongly disagree	Disagree	Kind of	Agree	Strongly agree
1. A Pap smear can be done so quickly that it is not a bother to have one.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
2. A Pap smear can find a problem even before it develops into cancer.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
3. A Pap smear is most helpful when you have one every year or two.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
4. A Pap smear is necessary even if there is no family history of cancer.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
5. A Pap smear finds cancer at a point when it is more likely to be cured.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
6. A Pap smear is not important for a woman in my age.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
7. Pap smear results cannot be trusted because some labs that do the test are better than others.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
8. It is humiliating to have a Pap smear.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
9. A Pap smear is not as important as people say it is.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
10. A Pap smear only finds problems when they are too far along to treat.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
11. Women who reach menopause do not need Pap smears very often.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
12. I worry that if I have a Pap smear, I will need an operation.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
13. I would probably not have a Pap smear unless I got a reminder from my doctor.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
14. After women stop having children they do not need Pap smears.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05

### Worry related to Cervical Cancer Examination

Please check the answer that applies to you.

	Strongly disagree	Disagree	Somewhat agree	Agree	Strongly agree
W1. I am worried about the situation that I no longer fulfill my role (e.g. job or social life) due to positive result of cervical cancer tests.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
W2. I am worried about putting my family in hardship due to positive result of cervical cancer tests.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
W3. I am worried about change of lifestyle of my family and myself due to positive result of cervical cancer tests.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
W4. I am worried about the test result	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
W5. I am worried about spending too much time for treatment due to positive result of cervical cancer tests.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
W6. I am worried about suffering from financial distress due to positive result of cervical cancer tests.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
W7. I am worried about losing my feminine characteristics due to positive result of cervical cancer tests.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
W8. I will be suffered from bad thinking while waiting for the result of cervical cancer test	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
W9. I am worried about being rumored that my family has cancer heredity due to positive result of cervical cancer tests.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05
W10. I am worried about physical pain due to positive result of cervical cancer tests.	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04	<input type="checkbox"/> 05

### Cervical Cancer Self-efficacy Scale

The following is to assess individual's belief about your ability to get cervical cancer screening. Please read carefully and choose one answer.

	not at all confident	not very confident	somewhat confident	very confident
1. Do you feel confident that you could have Pap tests on a regular schedule?	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04
2. Do you feel confident that you can ask your health care provider for a referral to get a Pap test?	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04
3. Do you feel confident that you can schedule a Pap test appointment and keep it?	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04
4. Do you feel confident that you can go to get your next Pap test?	<input type="checkbox"/> 01	<input type="checkbox"/> 02	<input type="checkbox"/> 03	<input type="checkbox"/> 04



## Personal Resource Questionnaire 85 Part-2

Now, I am going to read some statements with which some people agree and others disagree. Please listen each statement carefully and tell me how strongly you agree to each statement. There is no right or wrong answer.

1. There is someone I feel close to who makes me feel secure.  
Strongly Disagree    1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7 \_\_\_\_\_ Strongly Agree
2. I belong to a group in which I feel important.  
Strongly Disagree    1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7 \_\_\_\_\_ Strongly Agree
3. People let me know that I do well at my work (job, homemaking).  
Strongly Disagree    1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7 \_\_\_\_\_ Strongly Agree
4. I can't count on my relatives and friends to help me with problems.  
Strongly Disagree    1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7 \_\_\_\_\_ Strongly Agree
5. I have enough contact with the person who makes me feel special.  
Strongly Disagree    1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7 \_\_\_\_\_ Strongly Agree
6. I spend time with others who have the same interests as I do.  
Strongly Disagree    1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7 \_\_\_\_\_ Strongly Agree
7. There is little opportunity in my life to be giving and caring to another person.  
Strongly Disagree    1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7 \_\_\_\_\_ Strongly Agree
8. Others let me know that they enjoy working with me (job, committees, projects).  
Strongly Disagree    1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7 \_\_\_\_\_ Strongly Agree
9. There are people who are available if I were to need help over an extended period of time.  
Strongly Disagree    1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7 \_\_\_\_\_ Strongly Agree
10. There is no one to talk to about how I am feeling.  
Strongly Disagree    1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7 \_\_\_\_\_ Strongly Agree

11. Among my group of friends we do favors for each other.  
Strongly Disagree 1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7 \_\_\_\_\_ Strongly Agree
12. I have the opportunity to encourage others to develop their interests and skills.  
Strongly Disagree 1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7 \_\_\_\_\_ Strongly Agree
13. My family lets me know that I am important for keeping the family running.  
Strongly Disagree 1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7 \_\_\_\_\_ Strongly Agree
14. I have relatives or friends that will help me out even if I can't pay them back.  
Strongly Disagree 1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7 \_\_\_\_\_ Strongly Agree
15. When I am upset there is someone I can be with who let me be myself.  
Strongly Disagree 1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7 \_\_\_\_\_ Strongly Agree
16. I feel no one has the same problems as I.  
Strongly Disagree 1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7 \_\_\_\_\_ Strongly Agree
17. I enjoy doing little "extra" things that make another person's life more pleasant.  
Strongly Disagree 1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7 \_\_\_\_\_ Strongly Agree
18. I know that others appreciate me as a person.  
Strongly Disagree 1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7 \_\_\_\_\_ Strongly Agree
19. There is someone who loves and cares about me.  
Strongly Disagree 1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7 \_\_\_\_\_ Strongly Agree
20. I have people to share social events and fun activities with.  
Strongly Disagree 1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7 \_\_\_\_\_ Strongly Agree
21. I am responsible for helping provide for another person's needs.  
Strongly Disagree 1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7 \_\_\_\_\_ Strongly Agree

22. If I need advice there is someone who would assist me to work out a plan for dealing with the situation.

Strongly									
Disagree	1	2	3	4	5	6	7		Strongly
									Agree

23. I have a sense of being needed by another person.

Strongly									
Disagree	1	2	3	4	5	6	7		Strongly
									Agree

24. People think that I'm not as good a friend as I should be.

Strongly									
Disagree	1	2	3	4	5	6	7		Strongly
									Agree

25. If I got sick there is someone to give me advice about caring for myself.

Strongly									
Disagree	1	2	3	4	5	6	7		Strongly
									Agree

## **APPENDIX B. ADDITIONAL ANALYSIS AND STATISTICAL GRAPHS**

**Table A.1** Bivariate Correlations of Study Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1.Pap test use	1.000																
2.Age	0.0834*	1															
3.Education	0.0897*	-0.206*	1														
4.Length of stay	0.0611	0.032	-0.157*	1													
5.Health insurance	0.205*	-0.053	0.126*	0.218*	1												
6.Physician's recommendation	0.481*	0.086*	0.003	0.161*	0.219*	1											
7.AHL-C	0.226*	-0.171*	0.435*	0.180*	0.293*	0.248*	1										
8.Familiarity	0.224*	-0.098*	0.252*	0.205*	0.286*	0.291*	0.737*	1.000									
9.Comprehension	0.190*	-0.150*	0.315*	0.119*	0.234*	0.178*	0.857*	0.650*	1								
10.Reading Ability	0.172*	-0.130*	0.430*	0.081	0.212*	0.168*	0.825*	0.471*	0.578*	1							
11.Clause Test	0.195*	-0.174*	0.398*	0.213*	0.266*	0.212*	0.855*	0.463*	0.643*	0.637*	1						
12.Numeracy	0.026	-0.075	0.224*	0.044	0.069	0.086*	0.457*	0.206*	0.266*	0.325*	0.381*	1					
13.Cervical Cancer Knowledge	0.201*	-0.128*	0.246*	-0.102*	0.105*	0.136*	0.297*	0.268*	0.285*	0.203*	0.235*	0.127*	1				
14.Decisional Balance for a Pap Test	0.356*	0.055	0.136*	-0.003	0.147*	0.202*	0.251*	0.200*	0.188*	0.214*	0.229*	0.098*	0.342*	1			
15.Worry related to Cervical Cancer	0.022	-0.055	-0.006	-0.212*	-0.155*	0.032	-0.121*	-0.123*	-0.103*	-0.078	-0.100*	-0.054	-0.004	-0.105*	1.000		
16.Cervical Cancer Self-Efficacy	0.270*	0.008	0.097*	0.100*	0.177*	0.213*	0.215*	0.215*	0.191*	0.129*	0.181*	0.104*	0.162*	0.349*	0.029	1.000	
17.Perceived Social Support	0.090*	-0.111*	0.221*	0.069	0.223*	0.078	0.300*	0.150*	0.216*	0.335*	0.266*	0.122*	0.168*	0.203*	-0.184*	0.150*	1.000

Abbreviations: AHL-C: Assessment of Health Literacy in Cancer Screening

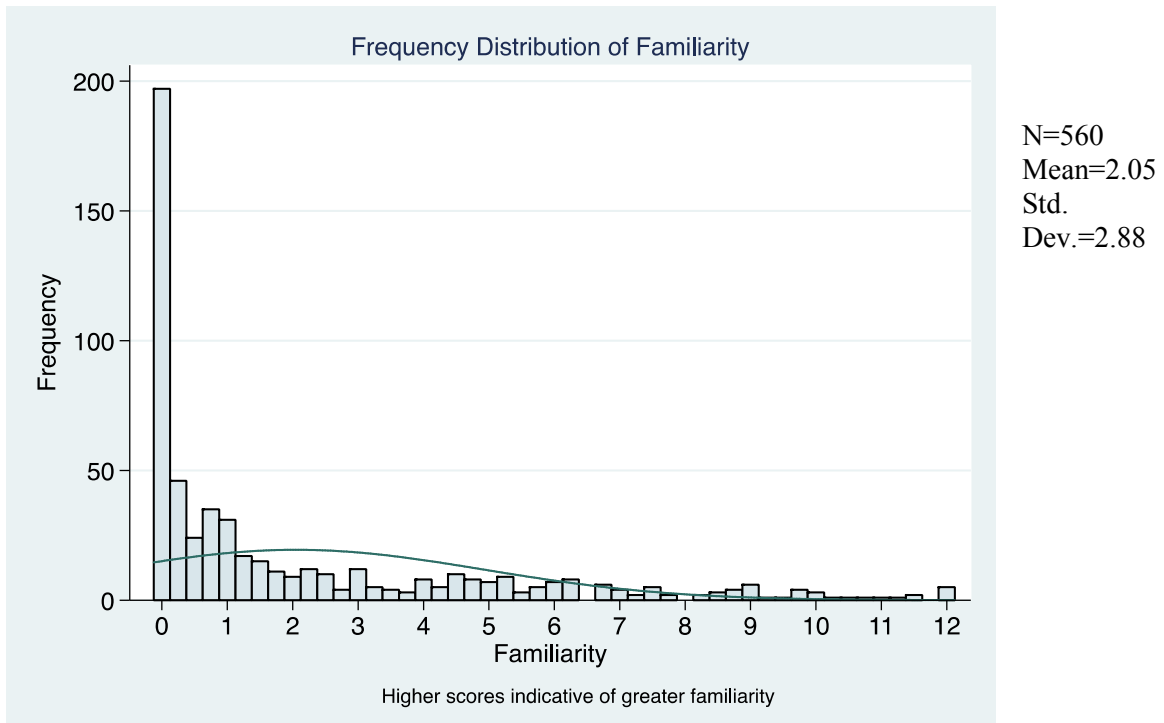
\*p&lt;0.05

The following variables were categorized: Pap test use ( $\leq 3$ yr or  $> 3$ yr), Age ( $<40$  or  $\geq 40$ ), Education ( $\leq$  high school or  $\geq$ some college), Length of stay ( $<25\%$  or  $\geq 25\%$  of their life), Insurance (yes or no), Physician's recommendation (yes or no)

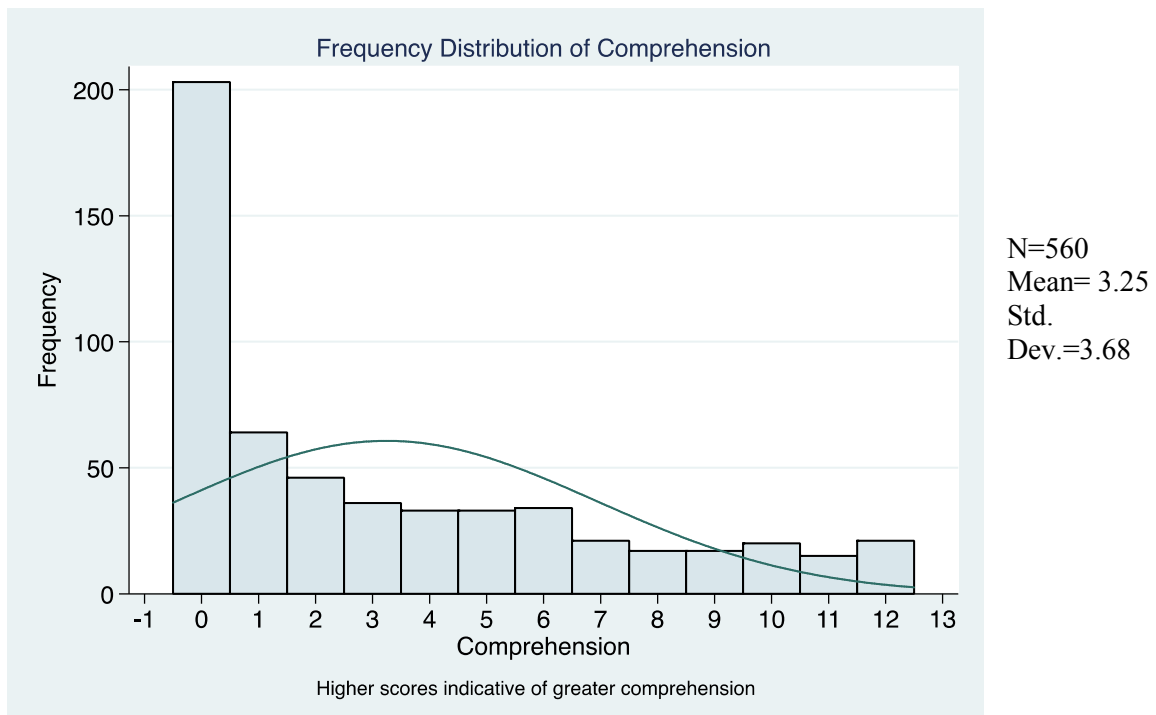
**Table A.2** Final Model Direct, Indirect, and Total Effects

Pathway	Direct Effect Standardized (Unstandardized)	Indirect Effect Standardized (Unstandardized)	Total Effect
Physician's recommendation to Psychosocial factor	0.511** (0.588*)	0.174* (0.201**)	0.685** (0.789**)
Health literacy to Pap test	--	0.214** (0.164**)	0.214** (0.164**)
Physician's recommendation to Pap test	0.920** (1.109**)	0.359** (0.433**)	1.280** (1.542**)
Physician's recommendation to Pap test through psychosocial factor	0.920** (1.109**)	0.268* (0.323*)	1.280** (1.542**)
Physician's recommendation to Pap test through health literacy and psychosocial factor	0.920** (1.109**)	0.091* (0.110*)	1.280** (1.542**)

**Figure A.1:** Histogram of Familiarity Scores

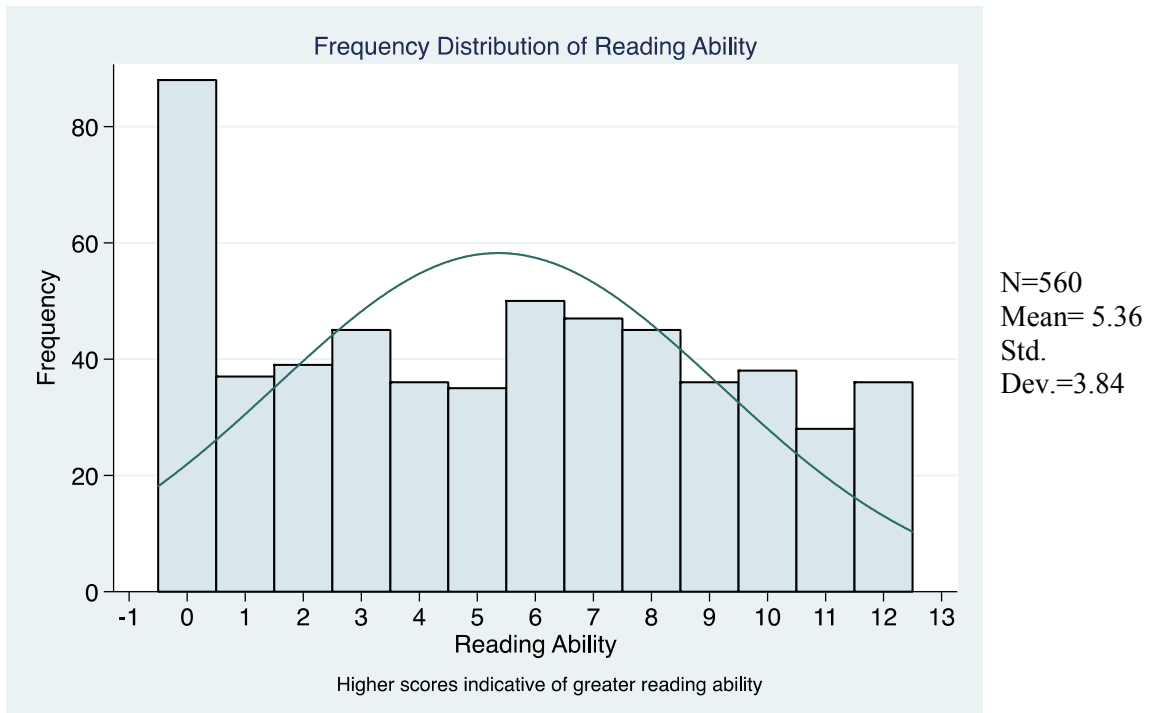


**Figure A.2:** Histogram of Comprehension Scores

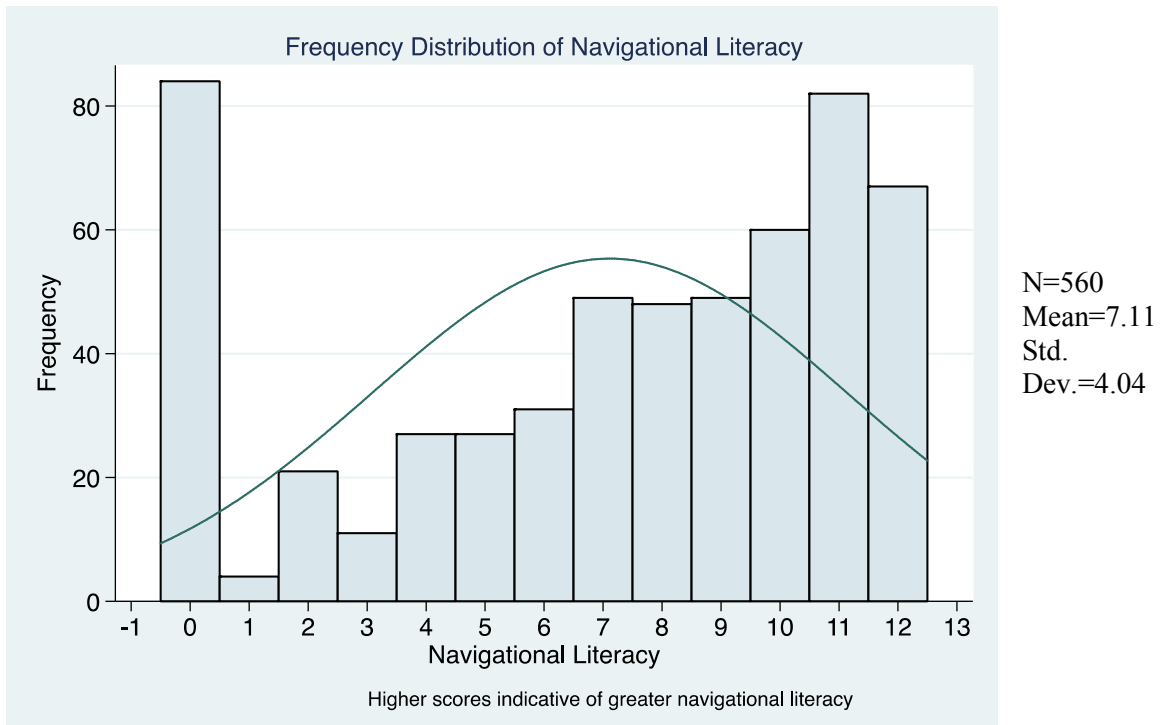




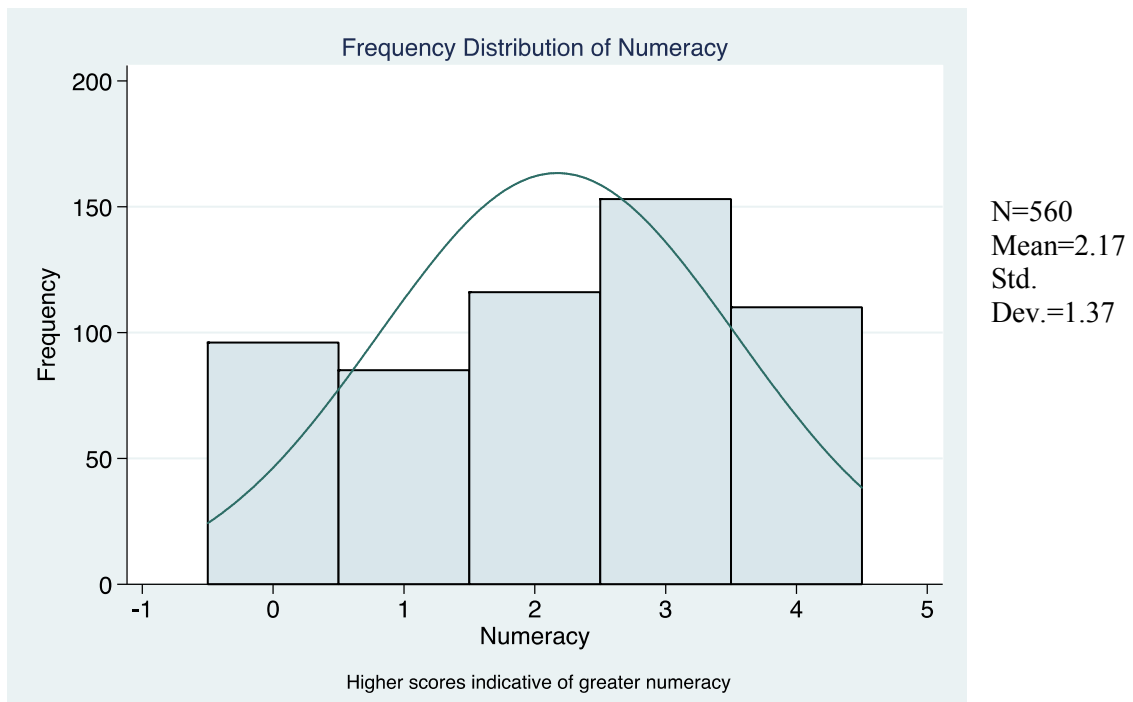
**Figure A.3:** Histogram of Reading Ability Scores



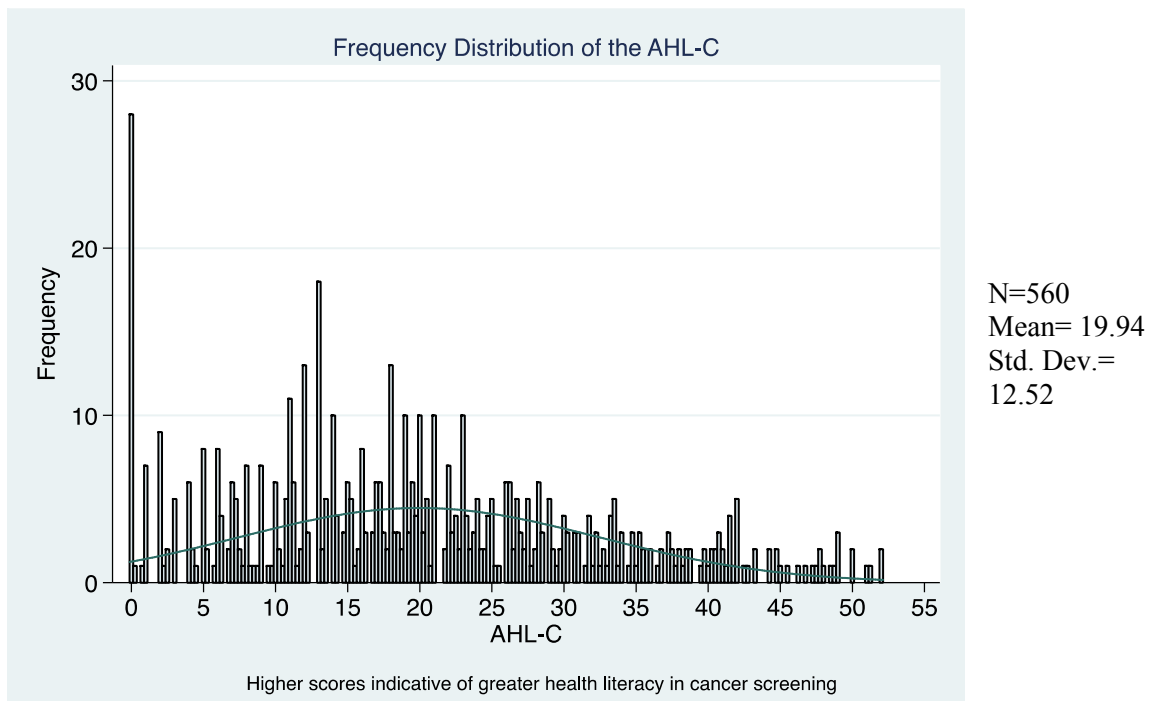
**Figure A.4:** Histogram of Navigational Literacy Scores



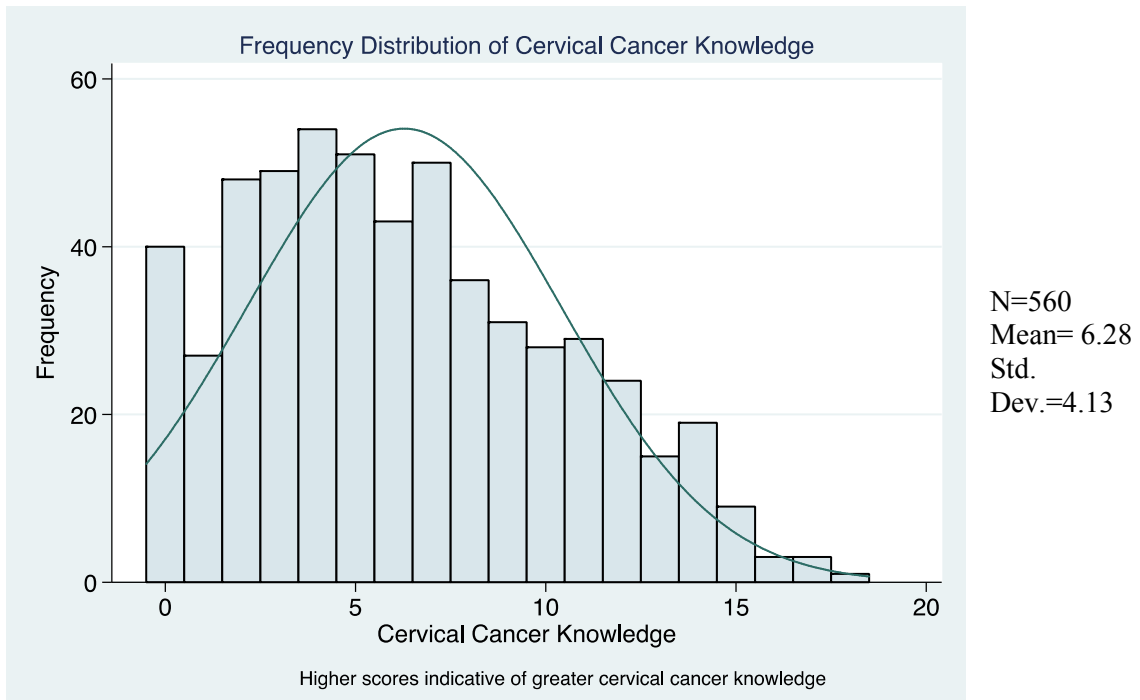
**Figure A.5:** Histogram of Numeracy Scores



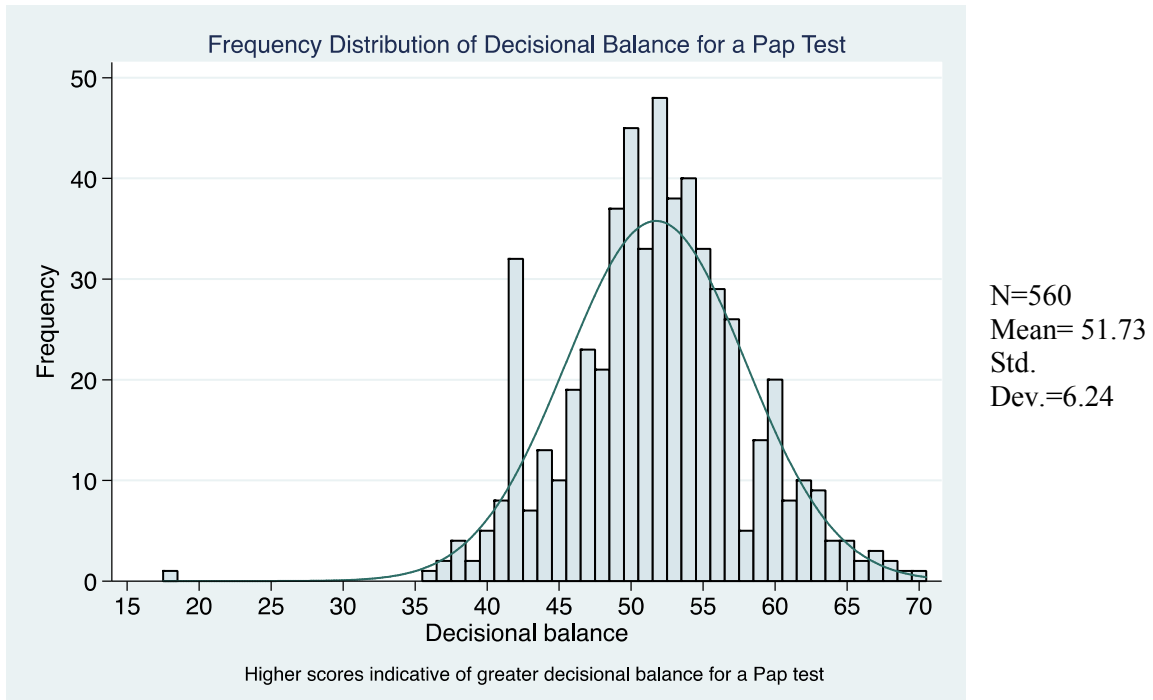
**Figure A.6:** Histogram of the Assessment of Health Literacy in Cancer Screening (AHL-C) Scores



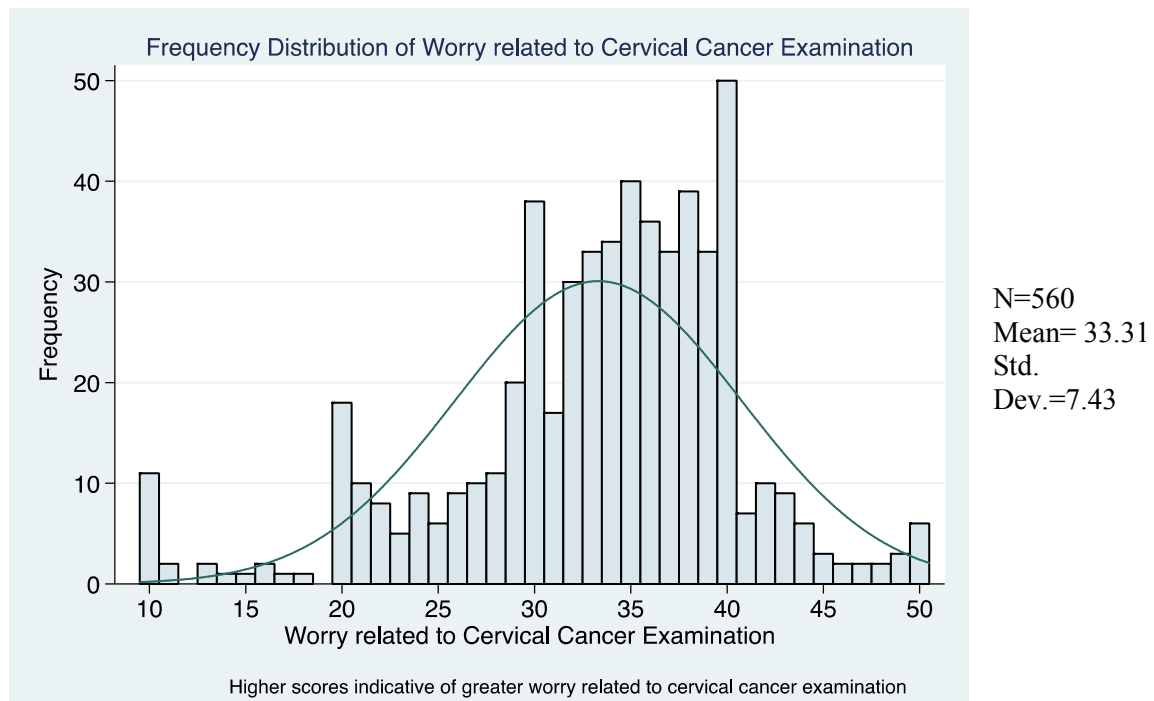
**Figure A.7:** Histogram of Cervical Cancer Knowledge Scores



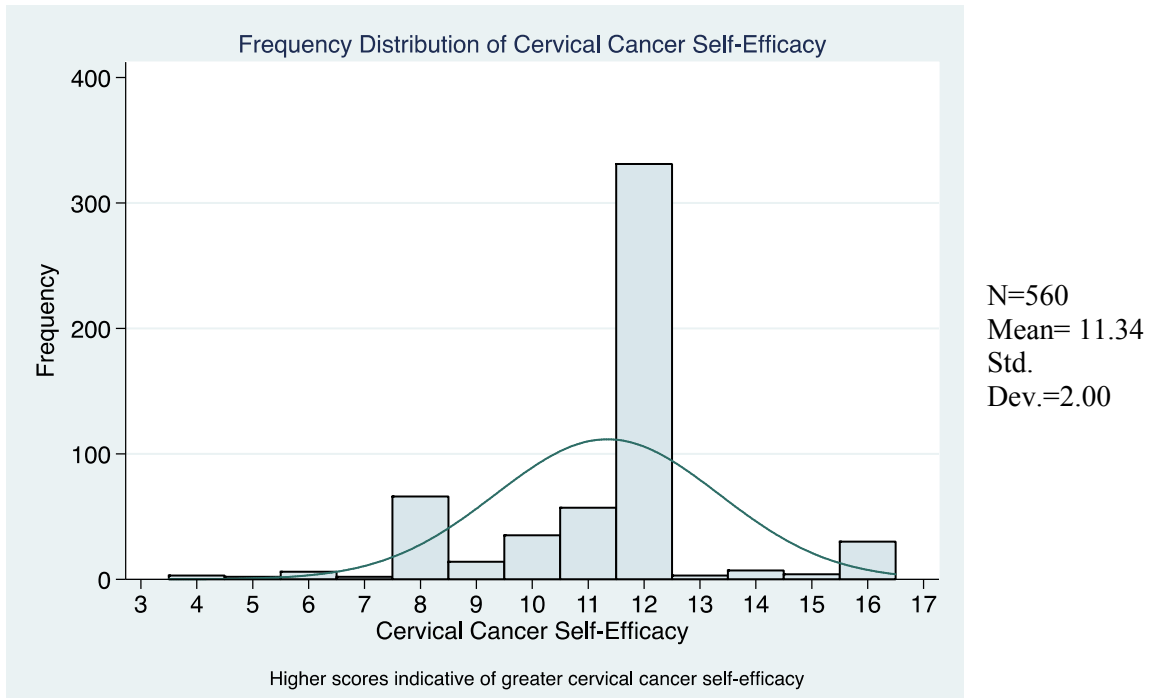
**Figure A.8:** Histogram of Decisional Balance for a Pap Test Scores



**Figure A.9:** Histogram of Worry related to Cervical Cancer Examination Scores

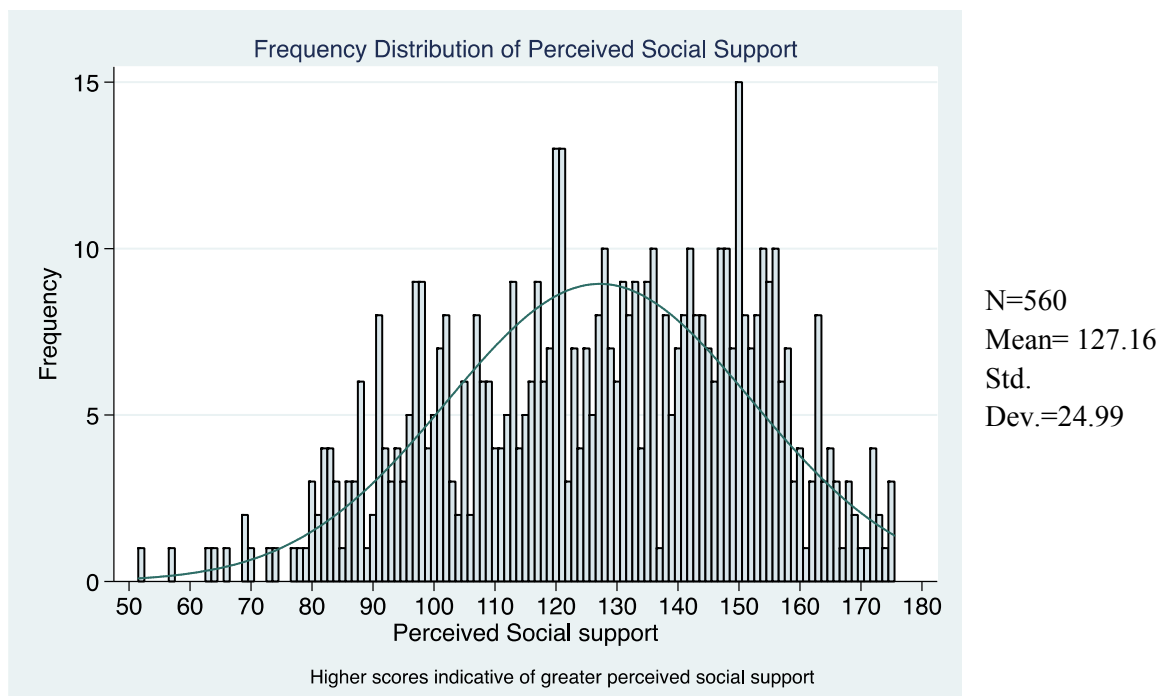


**Figure A.10:** Histogram of Cervical Cancer Self-Efficacy Scores





**Figure A.11:** Histogram of Perceived Social Support Scores



# CURRICULUM VITAE

## Part I

### **PERSONAL DATA**

Kyounghae Kim, MSN, RN, NP-C  
Address: 525 North Wolfe Street Baltimore MD, 21205  
Email: kkim96@jhu.edu

### **EDUCATION**

2011–	PhD program	Johns Hopkins University School of Nursing	Baltimore MD
2010–2011	Post-master	Lehman College Department of Nursing	Bronx NY
2008–2010	MSN	Columbia University School of Nursing	New York NY
2001–2005	BSN	Korea University College of Nursing	South Korea

### **TRAINING**

2013	Qualitative Research in the Applied Health Disciplines at the Institute of Nursing Science Summer School at Basel, Switzerland
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### **CURRENT LICENSE AND CERTIFICATION**

2011	Certified Registered Nurse Practitioner-ADULT	Maryland	# R197306
2011	Registered Nurse	Maryland	# R197306
2010	Certified by American Association of Nurse Practitioner		# A0410047
2010	Nurse Practitioner in Adult Health	New York	# 305319
2008	Registered Nurse	New York	# 596798

### **PROFESSIONAL EXPERIENCE**

2014–	Instructor, PhD Learning Lab, Johns Hopkins University School of Nursing
2013–2014	Study Session Coordinator, Johns Hopkins University School of Nursing
2013–2014	Teaching Assistant, Johns Hopkins University School of Nursing
2012–2013	PhD Biostatistics Tutor, Johns Hopkins University School of Nursing
2011–	Research Assistant, Johns Hopkins University School of Nursing
2010–2011	Nurse Practitioner, Northern Urgent Medical Care Flushing, NY
2005–2007	Registered Nurse, ICU, Korea University Guro Hospital, South Korea

### **HONORS AND AWARDS**

2014	A.T. Mary Blades Foundation Scholarship
2013–2014	Johns Hopkins University School of Nursing Graduate Assistantship Award
2013	Fahs-Beck Scholar, Doctoral Dissertation Grant Award
2013	ThinkSwiss Travel Grant Award, Institute of Nursing Science Summer School
2013	Sigma Theta Tau Nu Beta Chapter Research Grant Award
2013	Sigma Theta Tau International Small Grant
2012–2013	Caylor Award
2011–2012	Johns Hopkins University School of Nursing Scholarship
2009	New York Korea University Alumni Association Scholarship
2009	Inducted, Alpha Zeta Chapter Sigma Theta Tau International
2003	Korea University College of Nursing Volunteer Scholarship
2003	Korea University College of Nursing Scholarship

## **RESEARCH**

### **Sponsored Projects**

2009–2014	<p>Better Breast and Cervical Cancer Control for Korean American Women  The goal of this study is to test the effects of lay health worker-led, community-based educational interventions to promote breast and cervical cancer screening among Korean American women residing in the Baltimore-Washington Metropolitan Area.  PI: Hae-Ra Han  Agency: NIH/NCI: <u>R01 CA129060</u>  Role: Conducting preliminary data analysis and focus group (moderator), managing data, and developing manuscripts</p>
2011–2012	<p>Integration of North Korean Refugees in a New Society  The goal of this study is to systematically investigate the utilization of health services among NK refugees residing in South Korea.  PI: Hae-Ra Han (Center PI: Cherlin A)  Agency: NICHD/NIH: <u>R24 HD042854</u>  Role: Conducting preliminary data analysis and in-depth interviews</p>

### **Dissertation Research**

2013–2014	<p>Health Literacy and Cervical Cancer Screening Behavior among Korean American Women  Agency: Fahs-Beck Fund for Research and Experimentation  Type: Doctoral Dissertation Award, \$5,000  Role: PI</p>
2013–2014	<p>Exploring Perceptions and Decision Making About Cervical Cancer Preventive Practices in Korean American Women: How does It Differ by Women's Health Literacy?  Agency: Sigma Theta Tau International Nu Beta Chapter  Type: Research Grant Award, \$1,000  Role: PI</p>

2013–2014    Uncovering the Links between Health Literacy and Cervical Cancer Disparity in Korean American Women: A mixed methods study  
Agency: Sigma Theta Tau International  
Type: Small Grant, \$5,000  
Role: PI

### **Unponsored Research**

2013–2014    Exploring Critical Care Nurse Perceptions regarding Chaplains and Chaplaincy  
The goal of this study is to explore perceptions regarding chaplains and chaplaincy among critical care nurses who work at the Johns Hopkins Hospital.  
PI: Rebecca Aslakson  
Role: Conducting in-depth interviews and focus groups, qualitative analysis, and writing manuscripts

### **SCHOLARSHIP**

#### Publications (\*data-based)

1. \***Kim, K.**, Kim, B., Choi, E., Song, Y., & Han, H.R. Knowledge, perceptions, and decision making about human papillomavirus vaccination among ethnic minority women—A qualitative study using focus groups. *Women's Health Issues*. 2015 Mar-Apr;25(2):112-9. doi: 10.1016/j.whi.2014.11.005.

#### Publications in press

1. **Kim, K.**, & Han, H. R. Potential links between health literacy and cervical cancer screening behaviors: A systematic review. Submitted to *Psycho-oncology*

#### Publications in progress (\*data-based)

1. **Kim, K.** Factors influencing HPV vaccination among immigrant parents in the United States: A theory-guided, systematic review. Submitted to *Family & Community Health*

2. \*Han, H.R., Lee, J.E., **Kim, K.**, Chung, Y., Kim, M., Robinson, C., & Lee, M. Healthcare utilization among North Korean refugees in South Korea: A mixed methods study. Submitted to *Journal of Immigrant and Minority Health*

#### Publications in preparation

1. **Kim, K.** Choi, E., & Han, H.R. Community health worker interventions that improve chronic disease management and care among vulnerable populations – A systematic review

2. \***Kim, K.**, Roter, D., Nolan, M.T., Walton-Moss, B., & Han, H.R. Health literacy and cervical cancer screening among ethnic minority women in the United States: A correlational study.

3. \***Kim, K.**, Kim, S., Nolan, M.T., Han, H.R. Decision making about cervical cancer screening among Asian immigrant women: A qualitative study.

4. Heinze, K., Xu, J., **Kim, K.**, Kurtz, M., Park H., Foradori, M., Rosenthal, S., Nolan, M. End of life decision-making theory: A systematic review

5. \*Choi, E., **Kim, K.**, & Han, H.R. Racial and ethnic differences in the impact of social cohesion, neighborhood safety, and civic engagement on mental distress among older adults in California.

#### Presentations (\*data-based)

##### International

1. \***Kim, K.**, Roter, D., Nolan, M.T., Walton-Moss, B., Han, H.R. (accepted for oral presentation). Revealing links between health literacy and cervical cancer screening among Korean American women in the United States: Laying the groundwork for effective strategies to reduce cervical disparity. International Council of Nurses 2015 Conference (June 22<sup>nd</sup>, 2015), Seoul South Korea

##### National

1. \***Kim, K.**, Kim, B., Choi, E., Song, Y., & Han, H.R. (November 17, 2014, poster presentation) Knowledge, perceptions, and decision making about human papillomavirus vaccination among ethnic minority women—A qualitative study using focus groups. The American Public Health Association 142<sup>nd</sup> annual meeting, New Orleans USA.
2. \***Kim, K.**, & Han, H.R. (presented 2012). Factors related to the acceptance of human papillomavirus vaccine among ethnic minorities in the United States: A Systematic Review, 2012 Summit on the Science of Eliminating Health Disparities, Maryland USA.
3. \***Kim, K.**, Kim, B., Huh, B., Kim, M.T., & Han, H.R. (presented 2012). Exploring ways of translating human papillomavirus vaccine into cervical cancer preventive practices among Korean Immigrant women: A Mixed Methods Study, 2012 Summit on the Science of Eliminating Health Disparities, Maryland USA.

##### Regional

1. \***Kim, K.** & Han, H.R. (presented 2014). Association of health literacy with cervical cancer screening behavior among Korean American women. The 2014 Southern Nursing Research Society Annual Conference (from February 12, 2014 to February 15, 2014), San Antonio, Texas USA

### **EDITORIAL ACTIVITIES**

2013	Ad-hoc reviewer, <i>Journal of Palliative Medicine</i>
2013	Ad-hoc reviewer, <i>Research in Nursing and Health</i>
2012	Ad-hoc reviewer, <i>Progress in Transplantation</i>

### **PROFESSIONAL ACTIVITIES**

2012–	Member, Southern Nursing Research Society
2010–	Member, American Nurses Foundation
2009–	Member, Sigma Theta Tau International, Honor Society of Nursing

# CURRICULUM VITAE

## Part II

### EDUCATIONAL ACTIVITIES

#### Classroom Instruction (Johns Hopkins University School of Nursing)

Summer 2014	NR 110.401 Nursing for Adult Physical Health II (3 credits) Undergraduate, Students: 160 Facilitated in-class and on-line discussions, provided exam reviews, and conducted study sessions
Spring 2014	NR 110.401 Nursing for Adult Physical Health II (3 credits) Undergraduate, Students: 160 Facilitated in-class and on-line discussions, provided exam reviews, and conducted study sessions
Fall 2013	NR 110.313 Principles of Pathophysiology (3 credits) Undergraduate, Students: 160 Facilitated in-class and on-line discussions, provided exam reviews, and conducted study sessions
Fall 2012 –Spring 2013	PhD Biostatistics Tutor Doctoral, Students: 7

#### Guest Lecture (Johns Hopkins University School of Nursing)

Fall 2013	NR 110.313 Principles of Pathophysiology Undergraduate, Student: 160 Topic: Gastrointestinal system
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#### Course Development (Johns Hopkins University School of Nursing)

Summer 2014	Anatomy and Physiology (Online) Prerequisites
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### ACADEMIC SERVICE

#### School of Nursing

2013–	Student Representative, Korean Student Association
2013–2014	Vice-President, Doctoral Student Organization
2011–2013	Member, Doctoral Student Organization

#### University

2012–	SON Representative, Korean Graduate Student Association, Johns Hopkins University
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